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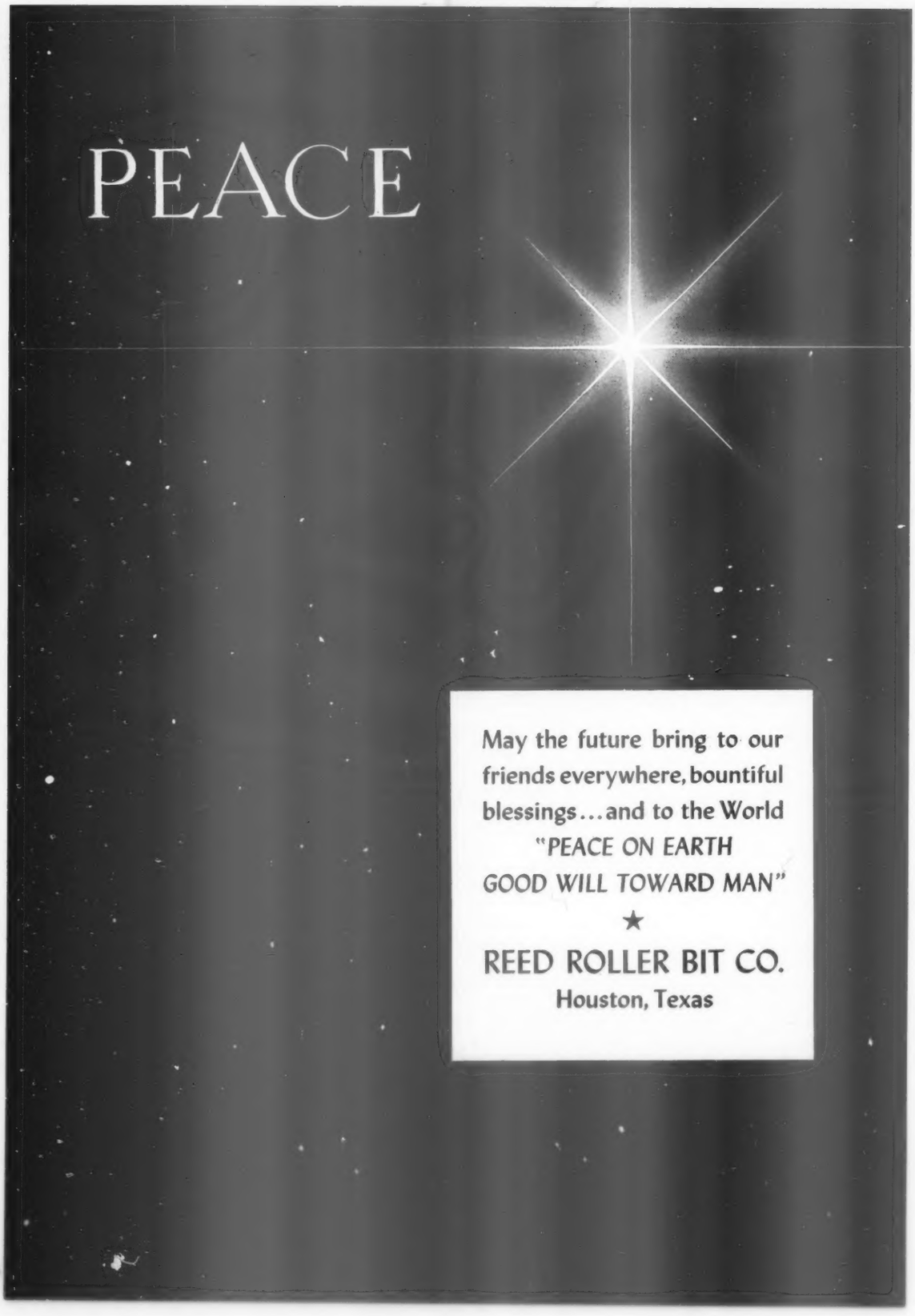
PEACE
May the future bring to our friends everywhere, bountiful blessings... and to the World
"PEACE ON EARTH
GOOD WILL TOWARD MAN"
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Houston, Texas

type of stills which enable it to produce asphalt; the right kind of crude is desirable also, so that this operation cannot be considered a generally applicable one. These refining plants all include a large number of standard products such as are made by the average refiner as common operating practice.

Table 2 illustrates the change in the refiner's

TABLE 2—YIELDS AND REALIZATION FROM REFINERY MAKING HIGH GASOLINE PRODUCTION

Product—	Price c/gal.	Yields— Before 12/1	Yields— After 12/1	Realization— Before 12/1	Realization— After 12/1
Gasoline	6.1	65.0	48.7	3.9650	2.9700
Kerosene	4.7	2.5	12.0	0.1175	0.5640
No. 1 fuel oil	4.2	5.0	11.0	0.2100	0.4620
No. 2 fuel oil	3.7	6.0	...	.....	.....
No. 6 fuel oil	2.0	12.5	23.3	0.2500	0.4660
Loss	..	9.0	5.0	.....	.....
Total—100 gal.	..	100.0	100.0	4.7645	4.4620
Total— 42 gal.	..	...	...	2.0011	1.8740
Balance above $1.33	..	...	...	0.6711	0.5440

picture who has heretofore striven for a maximum production of motor fuels with the necessary minima of other and cheaper products. Formerly making a total of 65 per cent gasoline, with small amounts of kerosene, burning oils and heavy bunker fuel this refiner earlier could realize $2.0011 gross return from each barrel processed, albeit with larger product losses and appreciably higher operating costs. If practicable to convert more of the burning oil to kerosene, a large return can be realized, 17 per cent of kerosene returning about 1 cent more per barrel if burning oil is reduced to 6 per cent. By this operation the refiner loses about 13 cents from his earlier return, about equal to the highest loss shown in Table 1. This is a serious loss and may necessitate a complete revamping of the refiner's plans, a plant shutdown or getting into production of aviation fuel or its components, or other "pegged price" war products.

How Yield Reductions May Be Made

The first thought in gasoline-yield reduction is to lower the end point. If the refiner has been making 50 per cent or more total gasoline, the end point is lowered to 350° F. or even to 325° F. from the earlier 400 end point, and on a crude yielding 30 per cent straightrun this yield may be cut to 20-25 per cent, depending on the composition of the fraction. This light gasoline will show a higher octane number, the lower octane rating material being in the heavier ends. A gasoline of such low end point is not entirely practicable for sale as motor fuel, especially when, as is usually the case, it must be blended with natural or recovery gasoline. Therefore, a heavier fraction of an octane rating higher than that boiling range in straightrun gasolines usually shows must be added to make a balanced fuel. This necessitates cracking.

The effort in cracking will be to maintain octane ratings at such levels that a reasonable amount of lead will suffice to bring the fuel up to housebrand antiknock standards with as little gasoline volume increase as possible. Two relatively simple answers to this problem are handy, provided the refiner has a polymerization unit, and a cracking unit or coil which is or may be used for reforming. These two steps offer the simplest means for reducing the amount of cracking required under a reduced gasoline production scheme. Polymerization of olefinic gases is predicated on cracking or reforming; maintenance of gasoline antiknock quality standards require cracking in nearly all cases, while the new regulations require reduction in total output.

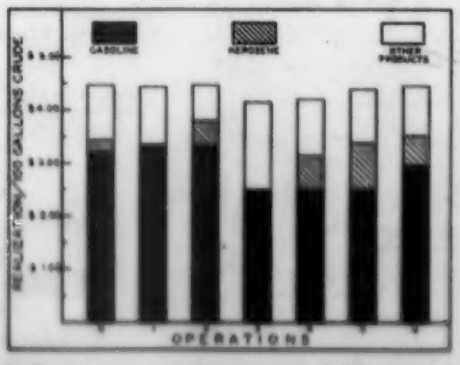
This situation is a contradiction. The refiner may solve it in part by combining the heavy gasoline fraction above the end point of his light gasoline cut, with the light kerosene ends up to, say, 475° F. end point, and reform the whole, reducing the total amount of gasoline which would otherwise be made, at the same time raising the octane number to 68-70 or even higher, to improve the average rating of the blend with the straightrun light cut. Olefins are formed at the same time, may be polymerized to 75-80 octane number and so further improve the antiknock of motor fuel with relatively little volume increase.

Some Cracking Necessary

If the refiner is producing codimer for aviation-fuel manufacture the provision of olefins is a "must." Therefore cracking in some form is also unavoidable; reforming is the answer to both problems. Particularly if an adequate volume of gases is available to warrant an auxiliary polymerizing unit, the tail gases from the codimer operation may be reprocessed at higher temperatures and pressures to yield 1 or 2 per cent of nonselective polymer extremely useful to the refiner's blending operations. Data on selective polymerizing conditions for codimer preparation as used at present are not divulged publicly, but an increase of 50 to 100 per cent in gage pressure and 50° to 100° F. temperature over those used in codimer making will produce this additional nonselective polymer efficiently, we are informed.

In cracking heavy oils to reduced yields, it is not practicable to do this merely by pumping less charge through the unit. In units designed for a given throughput, reduction of total charge increases the time of cracking, increases percentage yields of gasoline; coking is heavier, shutdown time is greater, and operating costs mount rapidly. Correspondingly, increasing total throughput—that is, either fresh charge or recycle—reduces the crack per pass and the total yield on fresh charge; lowered temperature aids the same result, as does pressure reduction. The refiner may reduce temperatures, say, to 915-20° from 925-30°, for example; pressure from 400 lb. to 350 lb., or from 900 lb. to 750 lb., increase throughput from 5,000 bbl. per day to 8,000 bbl., preferably additional fresh charge if practicable, recycle if necessary, or by any combination of changes and degree of changes, and thereby reduce the cracked gasoline to a value permissible when combined with his other motor-fuel components.

Viscosity breaking inevitably produces a certain amount of gasoline, 8-10 per cent or more on the charge. It is also generally necessary to break the viscosity of heavy fuel destined for Bunker C sale, now the insatiable consumer of heavy fuel. In some cases it may be satisfactory and



Realization from operations shown in Tables 1 and 2 (1 to 8) compared with present return (9)

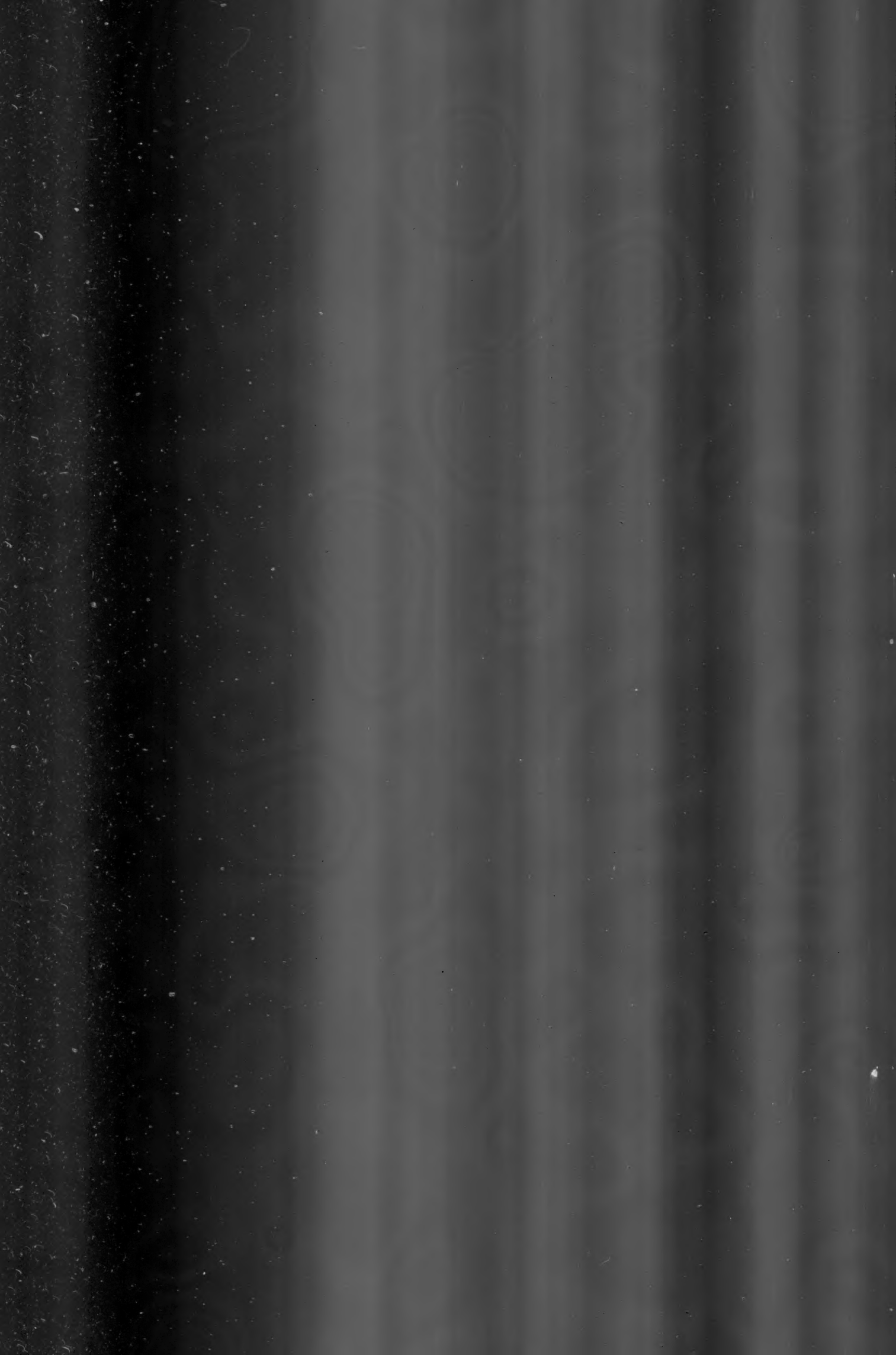
give adequate cracked-gasoline yield to charge the entire reduced crude, after removal of such burning oils, kerosene, etc., as may be wanted for those purposes, to a type of controlled viscosity-breaking operation; flashing the whole to drop out heavy fuel and fractionating with one or more sidestreams to take off intermediate oils is a type of operation which may be practicable for some refiners, especially when processing heavier crudes.

When revising outputs of intermediate products the situation is complicated frequently by state specifications, especially for kerosene, naphthas and tractor fuels. In Table 1, Operation 2, the 10 per cent kerosene is the maximum obtainable from that combination of crudes with 76 per cent gasoline plus fuel-oil production, the kerosene meeting the 125° F. flash point, 510° F. end point, 25 plus color specification. In Operation 1 the No. 2 fuel is the balance remaining after that required for cutting fuel oil is used. The No. 1 fuel oil made in Operations 1 and 3—13 and 21 per cent, respectively—shows the largest practicable yield of 125° F. flash point, 565° F. end point burning oil which can be made under those conditions from the crudes charged, while making the other products shown. Correspondingly the 1.5 and 5 per cent of No. 1 fuel in Operations 2 and 4 are the minimum yields of this product practicable when the 10 per cent distillation point is held below 410° F., with a 565° end point.

Heavy Crude Helps Program

Processing a heavier crude may frequently solve the entire refining problem of less gasoline and more fuel oil with still a profit, especially if a fair differential in crude prices is the case. Processing a 30° A.P.I. crude yielding 10-12 per cent straightrun gasoline and costing 20 cents a barrel less at the refinery, the distillate cracker charge stocks—heavy naphtha, gas oil—may be cracked to yield the remainder of 25-30 per cent gasoline; from cracking as much as 50 per cent of such heavy crude distillates, plus viscosity-breaking operations on the heavy residual, nonselective polymerization of the large amount of olefins produced will yield 2 to 4 per cent of the gasoline production. However, if the refiner has been processing too large a percentage of such a heavy crude on which his earlier yields of gasoline have been established, his present permissible yield may be well below the approximately 40 per cent average for the Southwest. In this case the heavy residual may be converted to asphalt, if demand permits; a 10-12 per cent asphalt yield will gross a return advantage, under prices given in Table 1, $0.0302 per crude barrel, with an equal fuel-oil yield, as against a 24 per cent fuel-oil yield alone, provided the asphalt can be sold. In either case the refiner has a net 20-cent price advantage on the crude to help make a payoff. Unfortunately under present conditions there is not enough heavy crude to go around, and the basis of regulated prices must be built on the situation of the majority of refiners who must process crudes containing much more than 10-15 per cent straightrun gasoline.

No attempt is made here to evaluate the return advantages derived from operation of a catalytic-cracking unit, from selective polymerization to make codimer, or for the manufacture of butadiene, butenes; aromatics, or other specific war products. Secrecy prevents any such attempt, for one reason; lack of certain, standardized cost estimates likewise make such evaluations undependable and an unknown quantity. Whether or not a refiner can make a living return from present operations with reduced "money crop" yields will depend on extent of market demands for other products and on the flexibility and efficiency of plant and its operation.



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RESOLUTION
for the Year Ahead

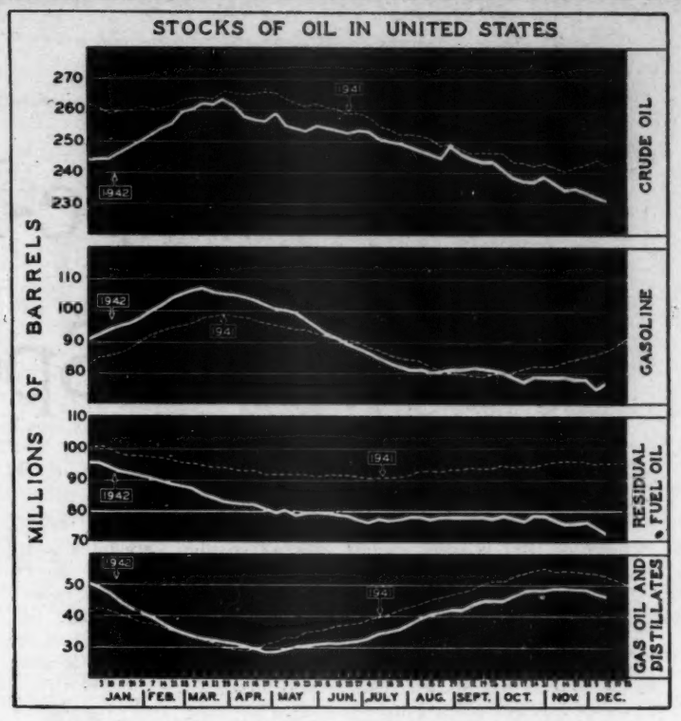
Whether with battle weapons, or with the hard-shooting McCullough Gun Perforator, we are resolved to put our bullets in the right place and with the greatest possible force behind them, contributing all that we can toward the Victory of our Nation in this war and in the peace to follow.

In the year ahead, McCullough Tool Company will do everything possible to serve you efficiently anywhere, any time—to the end that our fighting men will never be slowed by lack of oil.

McCULLOUGH TOOL COMPANY

Trends

Total Demand For Motor Fuel Ahead Of Expectations



THE continued heavy demand for gasoline is a year-end development which has come as a surprise to many who had anticipated that national rationing would bring substantial decreases in civilian consumption. While the situation in the East in which supplies on hand recently represented only 1 day's requirements was primarily brought about by a transportation shortage, it is also true that civilian consumption in that area has run ahead of expectations in recent weeks. In September, state gasoline tax reports show that the decline in civilian consumption of gasoline in the 17 eastern states and District of Columbia, with rationing fully effective, was 27 per cent. Most late-summer predictions had been that the decline would be 40 per cent.

This week's report of the Bureau of Mines, showing that total gasoline demand in this country during October was 88 per cent of October 1941, is also informative when analyzed in the light of known marketing conditions at this time. The B. of M. report does not give a breakdown of various demands because of war restrictions but the total figure reveals that civilian requirements under enforced rationing in part of the country and voluntary restrictions in use in the remainder of the country, were several per cent greater than the early fall projections. These data also point to a rapidly expanding military consumption within and outside this country.

Statisticians of the industry and those who have the direct responsibility of operating refineries are endeavoring to interpret these facts in relation to what the gasoline demand will be the first quarter of next year. In the East transportation is the controlling factor as to what will be done, with further restrictions in use by millions of users the immediate answer, according to the war agencies in control. For the remainder of the country where rationing has been effective since the first of the month the reports reveal that the civilian demands at stations have not declined as much as the operators had expected. This in turn has brought upward revisions in the January estimates as to supplies needed from refineries located in the Southwest and Middle West. These revisions also have a bearing on the crude requirements for next month. If these preliminary analyses are supported by more complete information available the last few days of the month, observers are pointing out that consideration will have to be given immediately as to how these enlarged motor-fuel demands will be met in all parts of the country. Recent reports also show a strong domestic, lend-lease and export demand for practically all the other products of refineries.

CRUDE PRODUCTION *3,909,750 bbl. daily average—up 51,930 bbl. One year ago 4,309,875 bbl.*

CRUDE STOCKS *231,896,000 bbl. as of Dec. 12—down 1,868,000 bbl. One year ago 242,683,000 bbl.*

GASOLINE STOCKS *77,622,000 bbl. as of Dec. 12—up 1,688,000 bbl. One year ago 88,862,000 bbl.*

RESIDUAL FUEL-OIL STOCKS *74,785,000 bbl. as of Dec. 12—down 434,000 bbl. One year ago 94,386,000 bbl.*

GAS OIL AND DISTILLATES *47,794,000 bbl. as of Dec. 12—down 869,000 bbl. One year ago 53,507,000 bbl.*

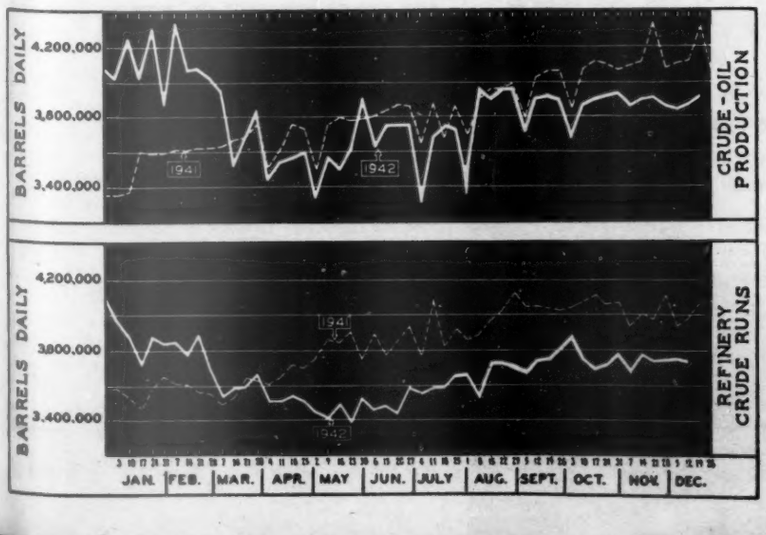
REFINERY RUNS *3,744,000 bbl. daily week ended Dec. 12—down 16,000 bbl. One year ago 4,009,000 bbl.*

Refinery report delayed.

DAILY AVERAGE PRODUCTION FOR WEEK

	Dec. 19 crude oil	Dec. OPA quota all oils	Dec. 12 crude oil
Arkansas	73,700	77,300	73,600
California	780,250	815,000	752,500
Colorado	6,710	7,000	6,660
Eastern fields	92,300	107,600	89,000
Illinois	240,800	274,100	250,100
Indiana	16,300	17,700	16,250
Kansas	305,700	300,700	284,700
Louisiana	313,200	326,100	314,900
North Louisiana	*90,200*	.....	*92,300*
Louisiana Gulf Coast	*223,000*	.....	*222,600*
Michigan	58,900	63,800	60,400
Mississippi	59,100	50,000	57,600
Montana	20,070	24,700	19,230
Nebraska	3,000	3,400	3,100
New Mexico	99,120	99,700	101,450
Oklahoma	357,150	403,900	349,300
Texas	1,390,150	1,350,400	1,385,250
East Texas	*358,600*	.....	*358,600*
West Texas	*209,300*	.....	*208,300*
North Central Texas	*139,900*	.....	*135,800*
East Central Texas	*101,500*	.....	*101,300*
Texas Panhandle	*93,200*	.....	*93,200*
Texas Gulf Coast	*402,250*	.....	*419,950*
Southwest Texas	*67,400*	.....	*68,100*
Wyoming	93,300	94,500	93,780
Total United States	3,909,750	4,015,900	3,857,820

Total production, January 1-December 19, 1942.....1,345,724,480 bbl.
Same period last year.....1,351,781,405 bbl.



Eastern Pipe-Line Survey Rushed to Speed Extension

By J. P. O'DONNELL

NEW YORK. — Survey work on the extension of the War Emergency Pipelines, Inc., line from Norris City, Ill., to Bayonne, N. J., and Philadelphia, Pa., is being rushed with all possible speed in order to expedite construction of this critically needed system. For example, all location work on the intermediate section, from Middletown, Ohio, to Uniontown, Pa., was completed by December 20, almost 5 weeks to the day from the time it was started. This section, originally mapped as 263 miles, will be nearer to 300 miles so that the surveyors have completed an average of 60 miles per week.

The middle section of the three is being surveyed by Lockwood, Kessler & Bartlett, of Brooklyn, N. Y. They have assigned seven crews, each consisting of six men, to the job. These crews are supplemented by several other men engaged in allied work so that the total field force comprises 45 men. There are an additional 10 men engaged in transferring field data to maps in the office which raises the number engaged in the project to 55.

Lockwood, Kessler & Bartlett, who had previously participated in the survey of the Texas-Norris City section, were notified November 9 to begin work on the extension. On November 11 a caravan of five station wagons and 15 men left New York for the scene of operations. On November 13 the first crew began work at Uniontown, Pa. On November 14 two parties were dropped at Woodsfield, Ohio, one to work east to the Ohio River and the other west to the Muskingum. On November 15 the fourth party was dropped at Circleville, Ohio, and on November 16 the fifth at Washington Court House, Ohio. Subsequently two additional crews which had finished work on the Plantation Pipe Line Co. extension from Greensboro, N. C., to Richmond Va., were added at Middletown, and Lancaster, Ohio.

Each crew, consisting of six men, includes a party chief, transitman, a chainman, a rodman and two brushmen. Except for the brushmen, who are hired locally, the parties are made up solely of men experienced in pipe-line work. The experience factor is important since it enables much better and faster work in reconciling two frequently opposing factors, the avoidance of undesirable locations and the maintenance of as straight a line as possible. It is also important when such obstacles as drainage ditches, highways, railroads, other pipe lines, streams and valuable property are encountered.

The station wagons which carry the men as close to their work as possible are equipped with ice chains, heaters, defrosters, radios and other equipment to insure their arrival and to meet any contingencies that may arise. Rubber hip boots are included to permit men to work in water as are snow boots which are important in mountain operations. Each of the wagons carries a small portable kitchen of sufficient size to prepare a hot lunch in addition to providing hot coffee throughout the day. The kitchen not only saves time by supplying lunch on the job but insures that the food will be hot. With the possible exception of ample cigarets, no other equipment is more highly valued by the men.

Working equipment includes not only that usually associated with survey work but also all conceivable auxiliary equipment. In addition to the transit, rod and chain, each party also has a aneroid barometer, an instrument not usually employed in pipe-line operations but which has contributed considerably to the speed attained on this job. Auxiliary equipment included machetes, kaiser knives, brush hooks, axes and other implements to cut down trees, brush and crops that interfere with the sighting of instruments.

Presurvey Preparations

Before going into the field, the men are supplied with route and aerial maps. The route maps show the location of every structure, road, natural obstacle, bench marks and other pertinent data. The previously made aerial maps give the general route of the proposed line which the parties adhere to as closely as possible with consideration for variations in terrain and obstacles which are not apparent in the aerial photographs. As soon as the location work is completed, the leveling work is started by new parties recruited in the main from the location parties. The Lockwood, Kessler & Bartlett parties are using aneroid barometers for this work, a departure from customary procedure. The use of these instruments, in which the men who employ them had to be specially trained, has been highly successful. As a result of their use, a saving of 50 per cent in

Above: Crew on location at an Ohio River crossing, in Ohio. The men are: chief of party Arents, oil man McClintock, transitman Darcy, and chainman March. Left: View showing construction, and some of the equipment used in building the line

time has been reported in addition to attaining greater accuracy.

The typical day for one of these parties begins well before dawn; in fact, normally the men are up, breakfasted and en route to their work an hour before dawn since it usually takes that much time to reach the point at which they quit the night before. Frequently the wagons cannot reach the site and in these instances it is necessary to finish the trip on foot, carrying the equipment. Since routes are chosen to disturb as few property owners as possible, the right-of-way passes through the wildest and least inhabited areas. This is considered even in rural areas where routes which will bypass the smallest communities are chosen. With this consideration on one hand and the matter of straightness, important from the standpoint of economy both in money and steel, on the other, it is obviously an undertaking in which experience is a highly desirable factor. Rights of the landowners must also be considered. This includes not only the disturbance of property but also trespassing. If provision is not previously made, this may entail a serious delay. Cooperation of farmers and other landowners on the route of the War Emergency line is reported to be exceptionally good. Only one serious case of trouble developed on the intermediate section.

Operating Difficulties

In addition to encountering a variety of terrain and other difficulties such as animals and insects the parties working in West Virginia and southwestern Pennsylvania encountered a rather unusual problem in pipe-line location work. The men are, incidentally, all inoculated against malaria and typhoid and carry first-aid and snakebite kits. This problem was the coal-mining area where 60 miles of the route traversed land under which coal had been mined, was being mined or probably would be mined in the future. Obviously not only surface rights but also subsurface rights had to be considered in this area. It was necessary to avoid all property under which mining had been or possibly would be undertaken. The attendant difficulties accounted for the greatest delay encountered in the entire survey.

Men who supplement the parties in the field are engaged in essential detail work. This includes locating and arranging for permission to cross railroads, highways, state lands, forest preserves, restricted game areas, other pipe lines and those streams which are considered navigable and therefore are under the jurisdiction of the War Department. Accurate knowledge of land ownership is necessary and since it is held by from one to 20 or 30 per mile, considerable work is involved.

The information outlined in the preceding paragraph will all be gathered before December 31. These data and the results of the field work are progressively transmitted to the engineers in the office where it is drafted into the maps on which the actual construction is based. These maps are designed to include all possible essential and to omit all nonessential detail. Three sets of maps are prepared in the office. First is the route map on a scale of 1 in. to the mile which gives the definite route of the line together with pertinent data. The second is the right-of-way map, covering the right-of-way area which varies from 50 to 75 ft. in width. This map, on a scale of 1 in. to 1,000 ft., provides information on property ownership, rodage, type of soil, type of vegetation, and similar data. The third is the profile map which presents the data obtained from the barometric leveling.

Sufficient progress has been made on the line that a considerable amount of pipe has been strung.

This Week...

PRODUCTION—Texas pledges unqualified acceptance of PAW production quotas, acts accordingly on certification of 1,426,800 bbl. daily for January, including 100,800 bbl. of natural gasoline and condensate. . . . Necessary allowable cuts to be practically horizontal. . . . Col. E. O. Thompson declares Texas capable of meeting 400,000 bbl. daily additional oil needed last of 1943. . . . Stripper well importance in national picture confirmed by Interstate Compact survey. . . .

MATERIALS—PAW instructs all operators to seek tubular goods from inventory, by initiating applications with district offices. . . . Inventory reports being coordinated, to give accurate check on location of all supplies. . . . Operators needing priority assistance will be directed to holders of inventory materials, first. . . . Daily conferences working out details of oil industry's position as claimant agency, general policies fixed, specific procedure to come later. Most agree it's big stride forward in equipment muddle. . . .

TRANSPORTATION—Government agencies to own oil passing through 24-in. line, buy it at Longview, sell it at eastern terminals; thus, saving on extra transportation charges. . . . More rigid ODT orders gradually meshing facilities into closer coordinated pattern; stricter regulations considered, if these don't do the job. . . . Tank-car movement fairly static, some cars now diverted to shorter hauls between rearranged pipe lines and coast. Tends to depress total rail-shipment figures, because eastern traffic isn't reported. . . . All WEP pipe in the ground, stations progressing. . . .

DISTRIBUTION—Breakdown in eastern supply, necessitating suspension of gasoline deliveries on A, B, and C cards 3 days, may bring policy changes. . . . James F. Byrnes functions as assistant president in dealing with situation, may presage more active part in general administration. . . . Congressmen, particularly New Englanders, sharpening axes for intensified investigation of oil situation, comes the new session in January. . . . Retirement of Leon Henderson from OPA may be followed by simplified rationing systems, unlikely to change economic policies. . . .

REFINING—Average yield of gasoline continues skid. . . . Bureau of Mines shows October average to have been 38.6 per cent, lowest yet registered, but higher than current operations. . . .

RUBBER—American mission to study Soviet synthetic processes appointed. . . . Gillette committee, seeking expanded use of farm products in synthetic plants, recesses until January. . . . Rubber Director Jeffers renews plea for critical materials, blames lagging equipment deliveries for delays, refers to unfortunate conflict with aviation-gasoline facilities. . . .

Study of Crude Prices First Job of New OPA Fuel Chief

WASHINGTON, D. C.—The resignation of Leon Henderson as chief of the Office of Price Administration and the appointment of Sumner T. Pike as director of the Fuel Price Division of OPA promise an early end to the long uncertainty over petroleum prices.

The White House announced Mr. Henderson's resignation December 17 and released letters between him and the President in which Mr. Henderson stated his health required him to stop work for some 4 months.

It is virtually certain that Mr. Henderson will be succeeded by Sen. Prentiss M. Brown of Michigan, who was defeated for reelection in November. Senator Brown is slated to take over from Mr. Henderson about the middle of January.

The real reason for Mr. Henderson's resignation was the popular resentment against rationing and price controls and particularly the methods used by OPA. Politicians generally agree that this was one of the chief reasons for the heavy Republican vote in the November elections, and members of Congress made no secret of their plans to oust Mr. Henderson at the earliest opportunity.

A large number of petroleum price problems are pending before OPA and Mr. Pike told oil writers at an informal press conference last week that he is approaching these with an open mind. In a lengthy discussion in which he displayed intimate knowledge of the oil industry he refused to commit himself on any specific price matter but promised that decisions will be reached shortly.

In considering oil prices, he said, he must be governed primarily by the OPA policy of preventing inflation, but he will also consider military and civilian needs for petroleum products and factors affecting the oil industry's ability to meet those needs.

In general, Mr. Pike said, there is no proof of any direct relationship between the price of crude oil and the rate of discoveries, pointing out that in the early '30s when crude was well below $1 per barrel wildcatting continued and the Conroe field was discovered. He admitted that there may be more effort to find and produce oil when the price is high, but said the limiting factor in wildcatting at present is lack of materials and manpower, and that an increased crude price would not necessarily bring more exploration.

Mr. Pike said he wished he could promise his friends in the oil business an immediate increase in prices but he cannot do that because his job is to determine to what extent price incentive is required to maintain production.

Survey of Stripper Wells Made At Compact Meeting

By W. V. HOWARD

At Oklahoma City, last week, the Interstate Oil Compact Commission did these things:

1. Received the first detailed nation-wide survey of stripper wells that has been made by any public body.

2. Accepted a report recommending a 5-cent minimum price for natural gas at the well head.

3. Received two drafts of "model" statutes for the conservation of oil and gas.

4. Adopted measures leading to greater usefulness of the commission.

5. Reviewed the achievements of the commission during the past year in which greater progress has been made than during any equal period in its history.

OKLAHOMA CITY, Okla.—A report on stripper wells prepared by the research and coordinating committee of the Interstate Oil Compact Commission showed that stripper wells abandoned since January 1, 1935, left more recoverable reserves in the ground than the remaining 300,000 such wells produced in 1941.

Stripper-well recoverable reserves by primary methods in all oil-producing states, except Louisiana, amount to 1,303,975,300 bbl. Additional reserves recoverable by secondary methods amount to 2,828,445,800 bbl., making total estimated recoverable reserves from stripper properties 4,132,421,100 bbl. These conclusions were presented to the commission at its quarterly meeting December 18 and 19 in Oklahoma City, Okla., by E. G. Dahlgren, chairman of the committee.

Gov.-elect Andrew F. Schoeppel of Kansas was elected new chairman of the Interstate Oil Compact Commission, succeeding Gov. Leon Phillips of Oklahoma, who retires in January. J. C. Hunter, Abilene, Tex., representative of Gov. Coke R. Stevenson on the commission, becomes first vice chairman, and Clarence Smith, Illinois, was elected second vice chairman. Charles L. Orr, Oklahoma City, continues as secretary.

Robert S. Kerr, governor-elect of Oklahoma, and Hiram M. Dow of New Mexico were elected to serve with the chairman and vice chairmen on the executive committee.

The opening address was given by E. L. DeGolyer, assistant deputy petroleum administrator, on "Problems of Exploration." Extended abstracts from his address appear on page 13 of this issue. Following Dr. DeGolyer, H. B. Fell, executive vice president of the National Stripper Well Association, outlined the events leading up to the presentation at this meeting of a national stripper-well survey. The Kentucky Oil and Gas Association recommended such a survey to the National Stripper Well Association, which called a meeting in St. Louis in March 1942 to consider the matter. It was then decided to enlist the support of the state regulatory bodies through the Compact Commission. In concluding his remarks, Mr. Fell recommended that the commission set up a statistical bureau for the purpose of collecting complete records of the industry so that it could carry on the statistical work now being conducted by PAW.

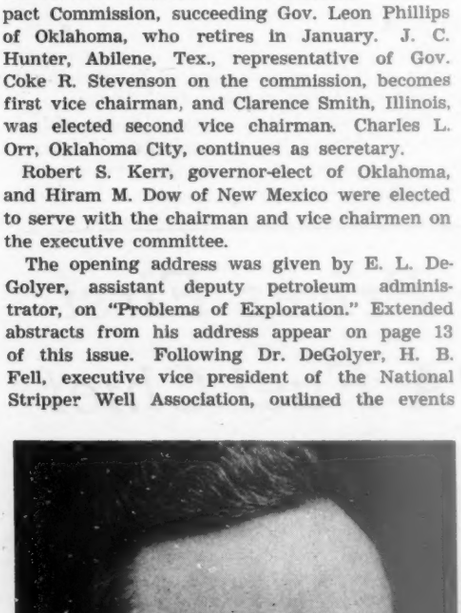
At the conclusion of his remarks, Mr. Fell read a paper by Charles P. McGaha on a typical stripper well in which the trials and tribulations of the operator were amusingly set forth.

Following the presentation of Mr. McGaha's talk, the commission received reports on the stripper wells of the different states.

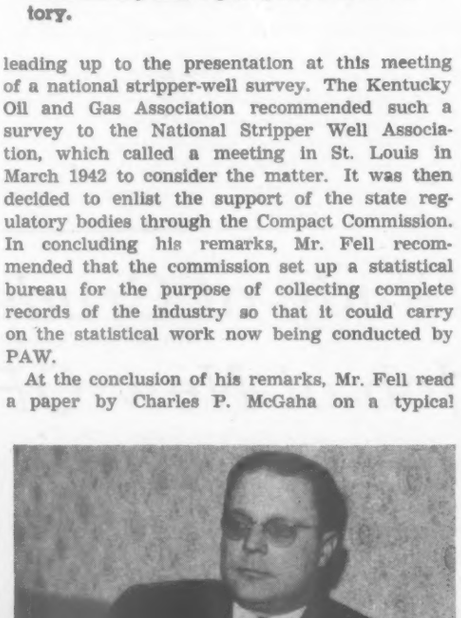
In Arkansas, according to the report read by Mr. Dahlgren, 83 per cent of the men employed in oil-production work on stripper properties, representing 33 per cent of the present production and 15 per cent of the proven reserves of the state. In California nearly 60 per cent of the wells are in the stripper class, having an average production of 8.2 bbl. per well per day. Of these 11,812 wells, some 7,000 are in the San Joaquin Valley and these produce a heavy crude for which there is currently the strongest demand in history because of military requirements. Another 3,000 stripper wells are in the Los Angeles Basin. In California, as well as in Arkansas, the stripper fields are well supplied with transportation facilities.

It is the general practice to abandon California stripper wells when they reach a daily production of 4 bbl. It is estimated that this results in a loss of 10,104 bbl. per well against a remaining output of 10,609 bbl. per well. Little secondary recovery has been attempted owing to the multiple ownership of pools, the low price of the heavy crude produced by the average stripper well, and the unsatisfactory nature of the sands and structures.

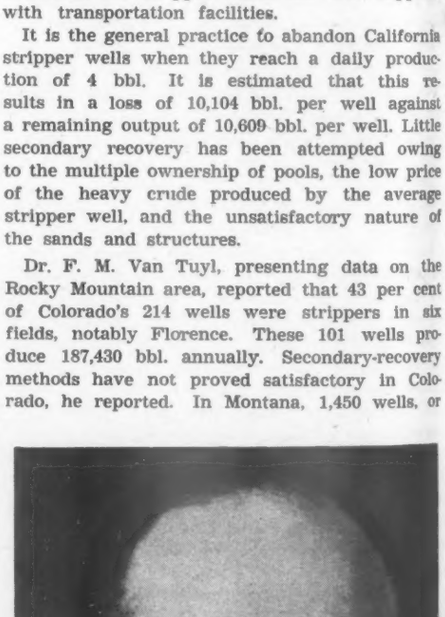
Dr. F. M. Van Tuyl, presenting data on the Rocky Mountain area, reported that 43 per cent of Colorado's 214 wells were strippers in six fields, notably Florence. These 101 wells produce 187,430 bbl. annually. Secondary-recovery methods have not proved satisfactory in Colorado, he reported. In Montana, 1,450 wells, or



Gov.-elect Andrew F. Schoeppel of Kansas was elected chairman of the compact



Clarence T. Smith, Illinois representative, was elected second vice chairman



J. C. Hunter, Texas representative, became first vice chairman

73 per cent of all wells in the state, are strippers, yielding an average of 3⅓ bbl. daily. Secondary recovery has been only tried experimentally and there appears to be little hope that it will add much to the recoverable reserves. Wyoming has 1,820 strippers, including half of the wells in Salt Creek. Twenty-four per cent of the light-oil production comes from these stripper wells. All of Utah's 17 wells are strippers. In the Rocky Mountain area, there is a strong demand for oil from stripper wells.

Samuel Peterson, reporting on Illinois and Indiana, said that all of the wells in the old fields were strippers and that all of the wells now producing from the new fields would probably become strippers within the next 3 years. Secondary recovery has been employed in some areas and it has been found that repressuring results in production of 1,000 additional barrels per well. Flooding adds 10,000 bbl. to the reserves of the average well where it has been employed. Indiana has 1,200 stripper wells, of which 1,050 are in the southwest and 150 in the old Trenton area. There has been little secondary recovery, owing to the low price but repressuring has proved successful in the Princeton field and accidental floods have added materially to production in Oakland and other pools. These results indicate that secondary recovery will prove effective if the price of oil warrants the commencement of operations.

Morgan Reviews Kansas

According to Theo A. Morgan, 68 per cent of Kansas' wells, producing 22 per cent of the state's oil, are stripper wells. Secondary recovery operations have been conducted in the eastern field and are expanding. It is estimated that 600,000 acres can be subjected to secondary recovery. Missouri has about 100 wells, all of which are in the stripper stage. These produce an average of 250 bbl. annually. The oil has a low gravity and it is not believed that secondary recovery would be effective. Nebraska has seven strippers, with other wells declining. As the area has a strong water drive, secondary-recovery methods would not be necessary or effective.

Daniel Jones, Kentucky state geologist, reported that all of the wells in that state were strippers. Their strategic location and high lubricating-oil content made it essential that these wells be kept on production. Practically all of the state is a market for second-hand equipment, as little new pipe is used. In Ohio there are 24,999 strippers out of a total of 25,141 wells. The average price is $1.62 per barrel, but Pennsylvania Grade oil gets $2.12 a barrel. Half of the wells produce this grade of crude. The average yield per stripper well is 99 bbl. Since 1935 more than 6,000 wells have been abandoned in Ohio and storage now stands at the lowest level in history, indicating the need for keeping existing wells on production. All of Tennessee's wells are stripper wells.

In Louisiana, according to H. W. Bell, 3,217 out of a total of 6,700 wells are strippers. The Shreveport district contains 2,692 strippers, 1,500 being in the Caddo-Pine Island field. The oil produced by these wells is normally a paraffin-base crude with a gravity range of from 19° to 45°. Secondary recovery has been employed in several fields in the state beginning with De Soto-Red River and has proved quite successful.

Reporting for Michigan, F. R. Frye said that 2,850, or 90 per cent of that state's wells, were strippers. These account for 55 per cent of the total production of the state. There is an acute shortage of crude in Michigan and these wells must be kept on production. With a few minor exceptions, secondary recovery has not proved successful.

John Kelly, reporting for New Mexico, com-

NUMBER OF PRODUCING OIL WELLS ABANDONED

State—	1935	1936	1937	1938	1939	1940	1941	Jan.-June 1942	Total
Arkansas	255	136	98	91	164	162	108	34	1,048
California	253	291	334	308	249	276	333	178	2,222
Illinois	289	262	103	126	374	327	239	131	1,851
Indiana	160	120	96	125	90	85	200	54	930
Kansas	600	644	594	482	640	534	699	289	4,482
Kentucky	350	200	200	200	300	400	250	100	2,000
Michigan	150	144	194	212	282	303	201	67	1,553
Missouri	3	3	4	2	3	5	5	3	28
Montana	14	17	15	39	50	26	51	10	227
Nebraska	0	0	0	0	0	1	4	2	7
New Mexico	5	6	8	4	12	10	10	4	59
Ohio	800	800	800	800	800	800	800	450	6,050
Oklahoma	1,366	1,132	1,007	1,175	1,075	1,249	1,247	672	8,923
Pennsylvania	2,000	2,100	3,600	1,500	1,200	3,000	2,500	1,200	17,000
Tennessee	7	4	3	3	4	4	5	2	32
Texas	1,530	527	1,519	1,320	1,894	1,342	3,670	1,771	13,573
Utah	8	6	7	6	4	5	5	2	43
West Virginia	310	338	265	330	250	322	472	237	2,624
Total United States	8,100	6,730	8,847	6,723	7,491	8,851	10,799	5,206	62,747

SHOWING PERCENTAGES OF STRIPPER WELLS TO TOTAL OIL WELLS

State—	Wells	1941 annual production	Productive acres
Arkansas	85.3	33.6	75.3
California	69.7	15.4	50.0
Colorado	47.2	10.0	36.6
Illinois	68.6	3.8	50.3
Indiana	64.4	13.9	50.0
Kansas	68.8	22.4	54.5
Kentucky	97.9	100.0	100.0
Louisiana	45.3	....	....
Michigan	96.0	54.6	82.8
Missouri	100.0	100.0	100.0
Montana	75.2	25.6	47.3
Nebraska	9.5	0.9	17.3
New Mexico	6.6	1.0	4.6
New York	100.0	100.0	100.0
Ohio	97.8	73.0	96.8
Oklahoma	87.0	33.4	87.0
Pennsylvania	100.0	100.0	100.0
Tennessee	100.0	100.0	100.0
Texas	31.5	6.6	18.9
Utah	100.0	100.0	100.0
West Virginia	100.0	100.0	100.0
Wyoming	51.5	7.3	....
Total United States	73.5	14.3	62.9

RESERVES LOST BY ABANDONMENTS (1935-41 INCL.) AND FOR FIRST 6 MONTHS OF 1942

(Barrels)

State—	1935-941, inclusive	First 6 months, 1942
Arkansas	1,723,800	61,200
California	20,652,576	1,798,512
Colorado	(*)	(*)
Illinois	4,306,000	327,500
Indiana	1,300,000	80,000
Kansas	(*)	(*)
Kentucky	2,850,000	150,000
Louisiana	(*)	(*)
Michigan	1,621,226	73,700
Missouri	100,000	1,600
Montana	397,200	14,100
Nebraska	15,000	(*)
New Mexico	1,500,000	100,000
New York	0	0
Ohio	5,600,000	450,000
Oklahoma	20,542,500	1,673,280
Pennsylvania	7,000,000	500,000
Tennessee	36,000	2,500
Texas	122,835,216	18,432,568
Utah	43,000	2,100
West Virginia	1,760,000	563,200
Wyoming	(*)	(*)
Total United States	192,276,518	24,230,260

*Not available.

NUMBER AND PRODUCTION OF STRIPPER WELLS, 1941

State—	Wells	Production, bbl.
Arkansas	2,510	8,843,921
California	11,812	35,373,060
Colorado	101	187,430
Illinois	16,065	5,145,000
Indiana	1,200	925,322
Kansas	15,000	18,700,000
Kentucky	14,000	4,855,000
Louisiana	3,217	8,030,000
Michigan	2,840	8,928,515
Missouri	100	47,000
Montana	1,443	1,926,431
Nebraska	7	15,000
New Mexico	239	397,398
New York	20,950	5,185,000
Ohio	24,599	2,440,091
Oklahoma	47,378	50,733,600
Pennsylvania	82,000	16,834,000
Tennessee	37	15,348
Texas	31,126	33,753,962
Utah	17	4,000
West Virginia	17,750	3,433,000
Wyoming	1,820	2,157,880

RESERVES OF STRIPPER WELLS BY PRIMARY AND SECONDARY-RECOVERY METHODS AT END OF 1941

(Barrels)

State—	Primary — Per well	Primary — Total	Secondary	Total
Ark.	17,540	44,025,400	500,000,000	544,025,400
Calif.	10,609	125,313,500	700,000,000	825,313,500
Colo.	3,000	303,000	1,200,000	1,503,000
Ill.	2,000	32,130,000	100,000,000	132,130,000
Ind.	1,255	1,506,000	1,600,000	3,106,000
Kans.	8,500	127,500,000	225,000,000	352,500,000
Ky.	4,000	58,800,000	104,000,000	162,800,000
La.	....	(*)	.....	.....
Mich.	7,745	22,004,000	0	22,004,000
Mo.	3,000	300,000	500,000	800,000
Mont.	14,585	21,046,000	2,891,200	23,937,200
Neb.	2,500	17,500	5,000	22,500
N. Mex.	7,000	1,659,000	10,000,000	11,659,000
N. York	0	0	118,000,000	118,000,000
Ohio	1,683	41,400,000	10,000,000	51,400,000
Okla.	7,450	353,724,000	344,542,000	698,266,000
Penn.	400	32,800,000	360,000,000	392,800,000
Tenn.	1,400	51,800	100,000	151,800
Texas	12,399	385,931,000	236,557,600	622,488,600
Utah	1,200	20,400	4500,00	470,400
Wyo.	12,400	22,677,200	(*)	22,677,200
Total U. S.		1,303,975,300	2,828,445,800	4,132,421,100

*Not available.

mented on that state's fortunate position in that only 239 wells, or 6 per cent of the total number, are strippers which yield 1 per cent of the state's production. These wells are in the northwestern part of the state and in the Artesia area, in both cases near refining centers. Mr. Kelly pointed out that, although the oil from these fields yielded only $400,000 in 1941, the pay rolls of the crews operating them were $630,000, indicating that the flush wells were carrying the strippers.

Dr. F. K. Yuster, reporting for New York, Pennsylvania and West Virginia, said that all of the area's 120,000 wells are in the stripper stage. Of these, 82,000 are on secondary recovery. Many wells still on the pump yield around 1/10 bbl. per day of high-quality crude.

In Oklahoma, according to Dan O. Howard, stripper wells are becoming increasingly important. The state's production has declined 55,000 bbl. daily this year and maintenance of stripper output, in part by secondary-recovery methods, kept it from falling still farther. Because of economic conditions, Mr. Howard pointed out, many secondary-recovery projects are not being maintained, and he estimated that 10 per cent of the stripper wells in the state are now shut down, despite adequate transportation facilities and a strong demand.

Third of Texas Wells Strippers

H. J. Struth, reporting on Texas, said that of the 98,802 wells in the state at the end of 1941, 39,625 were flowing, 28,051 were pumpers and 31,126 were strippers. The strippers have an average daily output of 3 bbl. Based on a study of the records of Texas' wells, 4,400 flowing wells go on the pump each year and 1,800 pumpers enter the stripper class. In 1941, however, 3,670 wells became strippers. Mr. Struth said that many stripper wells were abandoned prematurely because of the low yield and the fact that the average salvage value of a well was from $800 to $1,350.

In addition to the verbal reports summarized above, written reports were submitted to the commission, and these were summarized by Mr. Dahlgren in a number of tables, some of which are presented herewith.

Mr. Dahlgren also stressed the importance of maintaining stripper-well production, basing his argument on the decline in the discovery rate as shown by The Oil and Gas Journal's reserve estimates over the past few years.

Reporting for the regulatory practices committee, Theo A. Morgan, director of conservation for Kansas, reiterated the recommendation made at Chicago that a set of rules be prepared for the guidance of state regulatory bodies dealing with natural gas similar to those already in use with respect to oil. He further referred to the effects on conservation of the low price paid for gas in many areas and the over-all disparity in prices which range from less than a cent in many localities to 25 cents per thousand cubic feet in Pennsylvania. The committee recommended that statutes be passed by the various gas-producing states fixing a minimum price of 5 cents per thousand cubic feet for gas at the well head. Admitting that the legal questions involved were outside the jurisdiction of his committee, Mr. Morgan said that those members of the legal committee who had been consulted thought that such laws could be passed.

Dan Howard presented the research and coordinating committee report in which the committee's accomplishments were reviewed. These include a cooperative arrangement with the Bureau of Mines for collecting and analyzing samples of crude from new fields, the survey of secondary-recovery methods presented at the Lexington meeting in June 1942, the survey of natural gas presented at Chicago in September and the stripper-well survey offered at this meeting. Plans for increasing the collection and compilation of data were advanced and appreciation of the work of Mr. Dahlgren was expressed by a recommendation that his term of office be extended as well as by a special resolution offered by Mr. Frye and adopted by the commission.

Reporting for the legal committee, Earl Foster of Oklahoma presented two drafts of "model" statutes for the conservation of oil and gas based on existing laws. He said that the committee had considered a so-called "short form" law but that no producing state had such a law added to the fact that the shorter a law the more difficult it is of interpretation led them to submit longer and more detailed statutes. Of the two alternatives submitted, one gives the regulatory body the power to prevent waste and protect correlative rights, making a trial in court an appeal while the second does not give the commission power to protect correlative rights and thus renders an action in court a trial *de novo*.

J. C. Hunter, on behalf of the compact extension committee, recommended that Congress be asked to extend the compact for a 4-year period commencing September 1, 1943, and that those states which do not permit the governor to extend the compact pass adequate legislation as the compact itself provides a means for withdrawal of states should the legislature desire to take such action.

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Complete Acceptance of PAW Quotas Is Pledged By Texas

UNQUALIFIED acceptance in the future of the Petroleum Administration for War production quotas for Texas was pledged last week by Col. Ernest O. Thompson, member of the Railroad Commission, who read a statement outlining policies of the regulatory body before the Interstate Oil Compact Commission meeting in Oklahoma City.

"The Railroad Commission of Texas," declared Colonel Thompson, considers the directives of the Petroleum Administrator for War to be orders from the commander-in-chief of our Army and Navy and we will carry them out to the letter. This means we will produce no more than and no less than he certifies to us as being the amount of crude needed. In the past we have considered the recommendation of the OPC as recommendations and have followed them in the main. Certainly we never have produced less than the coordinator said to produce. We have produced, sometimes, more than he said when you consider condensates, distillates, and naturals. The production of these three items in Texas today runs about 114,000 bbl. The December production of crude in Texas is about in line with the recommendations of the OPC, which we received in November for the month of December, but we did not include the distillates, condensates and naturals, so the total of all oils produced in Texas will be about 114,000 bbl. daily in excess of the OPC recommendation. However, for the month of January our total production of all oils will be as near exactly at the figure ordered by the administrator in his certification as it will be humanly possible to make it.

"The Petroleum War Council has stated that 400,000 bbl. per day additional crude oil will probably be needed in the third quarter of 1943. We have been carefully checking in the State of Texas and our engineers, after careful study, are of the opinion that Texas can produce at least 400,000 additional barrels of oil per day without waste, if the transportation facilities are made available and, of course, if the need develops, transportation would be available — the need would insure adequate transport facilities.

"We are greatly encouraged in Texas over the East Texas oil field bottom-hole pressures. That field has stood up in a remarkable fashion, producing 10,000,000 bbl. of oil last month, with an increase in bottom-hole pressure of 0.88 lb. per sq. in. This is a remarkable performance which indicates that we are solving the water problem.

"We do not say that an operator cannot produce his oil no matter how small his production nor do we limit the amount of water he can produce with his oil.

"This water flooding and water reinjection program will mean the maintenance of bottom-hole pressure and will cause the production of 6 to 8 hundred million additional barrels of oil from the East Texas field.

"This is even better than the discovery of a new 600-million-barrel oil field because this one is already drilled and fully equipped.

"We must avail ourselves of every saving device possible. The water-oil ratio plan is just as sound as the long-recognized gas-oil ratio rule. Texas has a 2,000-cu. ft. gas-oil ratio for each barrel of oil where gas is the motivating energy."

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All Texas Areas Could Increase Production Above Present Rates

AUSTIN, Tex.—Practically all of the oil areas of Texas could make contributions to an increased crude-oil production when required in furtherance of the war plans, according to Col. E. O. Thompson, member of the Texas Railroad Commission. He explained Tuesday that the state could produce all of the 400,000-bbl. increase which the Petroleum Industry War Council has said will be needed for the entire country during the last quarter of 1943.

According to Colonel Thompson, the state's daily crude-oil output could be expanded in accordance with conservation regulations as follows: Southwest Texas, 20,000 bbl.; Gulf Coast, 15,000 bbl.; East Central Texas, 15,000 bbl.; East Texas, 150,000; West Texas, 200,000; West Central Texas, 4,500; and the Panhandle, 10,000. The East Texas increase assumes the installation of the necessary facilities to maintain the required ratio between water and oil production. The total production indicated is 410,500 bbl. daily. Colonel Thompson points out that these increases are minimum figures and certain areas could produce additional crude oil if necessary.

In accordance with the announced policy of the Railroad Commission to follow the PAW recommendations "to the letter" it was announced Tuesday that the January allowable in the state would be 1,426,843 bbl. daily. The PAW quota was 1,426,800 bbl. daily.

Four Attacks Proposed to Enhance Oil Exploration

By E. DeGOLYER
Assistant Deputy Petroleum Administrator

At least four attacks on the problem of finding new oil were recommended by E. DeGolyer, assistant deputy petroleum administrator. They are:

1. Development, through research, of new technique capable of finding structures which have not been discovered by methods now available.

2. Integration and refinement of the most effective methods now in use in order to increase success in locating stratigraphic traps.

3. Intensify use of all presently known methods, as well as those which may be developed in the future, in areas not now productive of oil but geologically favorable for its presence.

4. Cooperative efforts by all concerned to subordinate, for the duration, all private interests in order that the nation's oil reserves may be increased to such an extent that there will be no possibility of an oil shortage during this emergency.

The accompanying extended extracts from Mr. DeGolyer's address before the Interstate Oil Compact Commission at Oklahoma City, Okla., last week gives an up-to-date review of exploratory work, analyzes the results and outlines future obligations on the industry.

EXPLORATORY efforts in the United States, as measured by the number of wildcat wells drilled or by the number of geophysical crews and core-drill crews in operation, and these are excellent indices, is at an all-time peak. Slightly more than 3,000 wildcat wells were completed in 1941 and approximately the same number will be drilled this year. An average of some 222 seismic crews and 29 core-drill crews were in operation for the first 10 months of the present year, a greater number than at any previous time for which statistics are available.

Intelligently directed exploratory effort is at as high a rate as it has been at any time in the past. The results of such effort, however, are inadequate. They are below our hope and expectation. They are below our necessities. We are coming to the close of the fourth year when our new discoveries appear to have been at the rate of approximately 500 to 600 million barrels per year against consumption of substantially more than 1 billion barrels per year. Obviously, we have been losing proved reserves on balance.

Our proved reserves—something of the order of magnitude of 20 billion barrels—would be great enough for the war program if they could be recovered at the required rate and if their locations made them readily available. However, we know this is not so. We have been losing to a marked degree our ability to produce daily and such excess productive capacity as remains to us is, in large part, located where transportation facilities are not sufficient to make it immediately available. Excess productive capacity in the Gulf Coast or the Permian basin of West Texas and New Mexico will not compensate during the war period for deficiencies in meeting the requirements of the New England and Atlantic States, nor of California.

Causes of Unsatisfactory Conditions

What is the cause for the unsatisfactory conditions as to the results of exploration? In my opinion, it lies in our failure to discover large fields at a rate as great as we have discovered them in the past. From 1934 to 1938 inclusive, we found 121 new fields and an average reserve of 1.8 billion barrels of oil annually. The average estimated new oil discovered per field was slightly in excess of 15 million barrels. This average was high because each year's crop contained several fields with reserves of 100 to 200 million barrels or even more. For the years 1939 to 1941 inclusive, the average number of fields discovered annually was 242, exactly double the average in field units of that for the preceding 5 years. Because of the lack of finding big fields, however, the estimated reserve per field has dropped to less than 3 million barrels. Over the entire 8 years, the number of fields discovered in each year has been greater than that discovered in the preceding year but the average reserve has dropped from almost 20 million barrels per field in 1934 to less than 3 million barrels per field in 1941. There is no apparent marked change in this trend for 1942.

The results of recent geophysical activity and core drilling upon which much of the wildcat drilling of tomorrow must depend, are not susceptible of quantitative analysis at present. I am advised, however, that the first class prospects of the recent search, are comparable with the second and third class prospects of a few years back, and, on such basis, the outlook for discovery in the immediate future is not encouraging. Thus our low rate of discovery seems not to be a result of slackening of effort so much as due to the lower quality of prospects, which indicates an exhaustion of prospects discoverable by the present methods of utilizing known techniques.

For the purpose of our present consideration one might classify all types of oil deposits which occur in underground traps as consisting of traps formed by updip wedging out of porous beds or traps formed by folding or faulting, or both.

These are, respectively, the so-called stratigraphic and structural types of occurrences and, with the exception of a few relatively unimportant pools, all subsurface oil occurrences can be referred to one or the other of these types

It is in a search for the structural type of occurrence that the industry has, up to the present time, concentrated practically all of its scientific and technical skill. Geologists have searched for anticlines and domes; geophysicists have sought the same types of occurrences in areas where the geologists had not been able to find them. The structures now being found in known petroliferous provinces and which must be the main prospects for structural wildcat drilling within the next year or two are very small if the reports which we receive are correct. The point I wish to emphasize is that we appear to be about out of structural prospects. This suggests that we must depend increasingly upon the discovery of the stratigraphic-trap type of occurrence at least until we emerge from the present doldrums of exploration in our known petroleum provinces or until a new prolific area is opened. Stratigraphic fields thus far discovered include such areas as East Texas, Burbank, Hull-Silk, Kern River, and Kern Front, and the shoestring pools of Kansas.

From the viewpoint of the prospector, I should say that the distinguishing thing about the stratigraphic trap type of occurrence is that it has required much greater amounts of drilling for discovery than has the structural type. The problem of exploration is not nearly so well localized in drilling stratigraphic traps as it is in drilling structural traps. A well drilled on a structural trap should determine the possibility of finding oil to the depth drilled in 80 or 90 per cent of all possibilities whereas it is entirely possible that 8 to 10 dry holes might be drilled on a vaguely outlined stratigraphic prospect before the location for a definitive well could be determined.

New oil fields must be found to insure a continued supply of petroleum products. There must be wildcatting and exploration to open new pools, the majority of which probably will be of the stratigraphic type. This means many dry holes even if the best finding techniques are employed because no methods have been developed which can determine the occurrence of oil.

Concerted Efforts Required

The problem of finding new reserves cannot be solved by application of any single method. Every known method must be utilized. New uses of present techniques must be developed and even random drilling must be employed more and more. Existing data, geological and geophysical, must be restudied and reappraised in the light of our most advanced knowledge of oil occurrence and we must be prepared to take longer chances in wildcatting than has been the custom during the past 10 years.

At present, in our major producing areas and with our available finding tools, the stratigraphic-type occurrence offers the greatest promise of increasing our oil reserves.

Subsurface experts, by comprehensive studies of regional geology and lithology, should be able to outline areas in which oil pools may exist even though it will not be possible for them to indicate the exact location for successful wildcat

wells. Further improvements and developments in present techniques and the geologic data to be contributed by many dry holes should eventually lead to comparatively precise methods for checking areas of promise and determining to some degree where the permeable strata exists under the requisite trap conditions—conditions which are not determinable from the surface. Slim-hole drilling should contribute information from which subsurface maps may be prepared and eventually oil pools located.

In order to find structural prospects, we must explore with our proven techniques and tools those areas not yet detailed but where geological factors appear favorable to the accumulation of oil. I am sure that we all know that there are some areas in such oil-producing states as Texas, Louisiana, Arkansas and Kansas, to mention a few, which have not been covered by detailed surveys of the highest type of resolving power. Also, there are much larger areas in nonoil-producing states or in states producing comparatively small amounts of oil such as Montana, Nebraska, North and South Dakota, Florida, and in other regions, which, from geologic considerations, could become oil productive. Reasons for the lack of determined effort in these areas is, first, the fact that intensive exploration usually has been concentrated along proven productive trends, and, second, high costs. However, these areas must be investigated since, today, they offer the most fertile ground for our proven exploratory tools, and are among our best prospects, until a new method of exploration is developed, of finding additional oil and gas pools.

Planning Essential to Success

Careful planning and procedure will result in concentrating our wildcat efforts in those areas where success is most likely to be achieved and, if diligently carried out, should result in increasing our oil reserves and our ability to produce more oil currently.

These types of exploration programs—that is an intensive search for stratigraphic traps and such additional structural prospects as remain, both along productive trends and in comparatively new areas—will require infinitely more technical work, more wildcat wells, more dry holes per oil pool found, and, inevitably, a higher finding cost at least until more certain methods and techniques of finding are developed than are now available to the industry.

In my opinion the finding cost entailed in the extensive exploration for stratigraphic traps and for additional structural accumulations is known or new areas could easily be at least twice as high as the present finding costs of some successful companies which range from approximately 20 to as high as 35 cents per barrel. In contemplating these latter figures, it should be borne in mind that these costs are for successful companies and do not take into account the large amounts of "venture" money invested in the oil business that will never pay any return and in many cases is lost entirely.

If the estimated costs of finding additional oil reserves should become as high as 40 to 70 cents per barrel, it will readily be seen that to increase our oil finding and oil reserves, it is likely that we will return again to the cooperative type of venture which were so common in the Mid-Continent in the twenties.

It would appear to me that a return to the old type operation is indicated. By this I mean the development of a prospect to the stage where a test well is desirable, followed by the selling of spreads of leaseholds or percentages to various other interests. This will reduce the risks and cost of individual companies or operators. Likewise, in my opinion, there exist today areas that are good prospects for exploration but in which the actual drilling of wildcats is being delayed because of checker boarded lease ownerships and inability or reluctance of the operators to get together on any planned cooperational operation.

It has now been approximately 13 years since a new method of locating oil prospects has proven its worth. Since there is no new method on the horizon which has yet presented evidence of revolutionizing the search for oil, it is up to the industry geologists, engineers, geophysicists, executives, as well as all persons connected with oil, including the state regulatory bodies and the Interstate Oil Compact Commission, to help adjust and improve all methods now in existence and to minimize the higher costs that are bound to attend the intensive search that must be undertaken for new reserves.

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Operators Are Instructed to Seek Pipe From Inventory

A system of handling all possible tubular-goods priority requests from inventories of the petroleum industry was set up this week to function through the district office of the Petroleum Administration for War.

An operator needing pipe must first contact the district office of the PAW. Administration offices will advise from MA-2 inventory data whether or not the material needed can be furnished from some other operator's stocks near the area in which supplies are required.

If the material is available, the operator will be informed where the material can be secured and if the material is not available a written statement will be made by the district office of PAW to that effect. The statement advising that tubular goods are not readily obtainable from inventory must accompany the operator's application for priority assistance which is handled in Washington on Form PD-1-a.

The new procedure for drawing maximum tubular requirements from inventory was announced simultaneously from the five district offices of PAW at New York, Chicago, Houston, Denver and Los Angeles and through the subdistrict office now established in Tulsa.

S. R. Clinkscales, on leave from Frick-Reid Supply Corp., is now stationed in Tulsa in charge of materials for District 2. All operators seeking inventory information on tubular goods within District 2 should contact the Chicago, Ill., office where records are being maintained on MA-2 reports. Later, the inventory data will be transcribed and a duplicate set of reports made available to the Tulsa office but until this task is completed, Mr. Clinkscales emphasized, the applications should be directed to Chicago.

Next Week--The INTERAMERICAN Number..

FEATURING . . .

- Maps and discussions showing pertinent changes in world-petroleum affairs during the first year of global war, including graphically illustrated demarcations between resources under Allied and Axis control and their significance.
- Bilingual section, in Spanish and English, describing technical developments in oil operations—drilling, production, exploration, refining, pipe-line transportation, and natural-gasoline manufacture. A review of restrictions on and mechanics of exporting oil equipment.
- The Journal's estimate of world production.
- Engineering articles on practices in Latin America.
- A review of the Foreign Division, Petrolem Administration for War.

La Proxima Semana--
El Numero INTERAMERICANO

QUE CONTIENE . . .

- Mapas y discusiones relativas a importantes cambios en el mundo petrolero durante el primer año de la guerra global, incluyendo demarcaciones graficamente ilustradas entre los recursos bajo el dominio de las Naciones Unidas y bajo el dominio del Eje, y su significado.
- Sección bilingue, en castellano e inglés, que describe los desarrollos técnicos en todos los trabajos de perforación, producción, exploración, refinación, transporte por oleoducto y manufactura de gasolina natural. Una revista de las restricciones sobre la exportación de equipo petrolero.
- El cálculo de la producción mundial, según el Journal.
- Artículos técnicos sobre prácticas en la América Latina.
- Funciones y personal de la División Extranjera de la Administración del petróleo durante la guerra.

Breakdown in Eastern Supply May Result in Policy Changes

By HENRY D. RALPH

WASHINGTON, D. C.—The breakdown in the gasoline-rationing system and shortage of petroleum products in the East last week end is expected to lead to a realignment of administrative machinery and policies in the near future.

All gasoline sales were suspended to holders of all but commercial "T" ration books in the 17 eastern states and the District of Columbia from noon December 18 until 12.01 a.m., December 21, except for a few emergency sales, when supplies in many parts of this region became virtually exhausted. After 2 days in which motorists feared they might get almost no gasoline for several weeks the Office of Price Administration permitted the resumption of sales with the value of "B" and "C" coupons cut to 3 gal. from 4 gal., and with "A" coupons remaining at 3 gal. In West Virginia "A" coupons were cut from 4 gal. to 3 gal.

The blame for this breakdown in supply and distribution systems was universally laid on the administration, and the challenge was taken up by James F. Byrnes, director of economic stabilization. He summoned to his office Monday morning Harold L. Ickes, petroleum administrator; Leon Henderson, of the OPA, and Joseph Eastman, director of the Office of Defense Transportation.

Restrictions to Continue

After the conference with Messrs. Ickes, Henderson and Eastman, Director Byrnes said there is no hope for any lessening of restrictions on the use of gasoline and fuel oil in the East. He said the three agencies showed a splendid spirit of cooperation in an effort to solve the immediate problems resulting from unanticipated demands for military purposes. No changes in procedure by any of the agencies will be made at this time, but they were to meet with Mr. Byrnes again Wednesday with written proposals and in the meantime were to take immediate steps to increase the supply and to improve rationing methods.

PAW Monday issued Petroleum Administrative Order 1 controlling the amounts of gasoline and fuel oil that may be withdrawn from District 1 refineries and terminal points. Within each of the six supply zones the sum total that may be taken from tanks must not exceed figures which PAW determines to be the supplies available. It was said this will insure that sufficient supplies will be available at dealers to meet all outstanding ration coupons.

Mr. Byrnes issued a statement saying that "at this time, three agencies are exercising primary responsibility in the control and distribution of the supply of gasoline and fuel oil," referring to PAW, OPA, and ODT.

"Because of recent developments affecting the eastern seaboard areas, I have requested these agencies to submit to me as quickly as possible reports indicating:

"1. In what respects our existing policies and machinery may not be effective, and

"2. What remedial action should be taken both for the present and the future."

It was generally believed that out of this conference and the actions which Mr. Byrnes may take as virtual deputy of the president would come a better definition of the authority of the three agencies and more effective plans to keep petroleum supply and rationed demand in balance.

The chief immediate cause of the supply deficiency was laid to heavy requisitionings by the Army and Navy for use in the North African campaign, and while no figures were released there was ample evidence, from the White House and elsewhere, that these shipments from East Coast ports have been substantial during the past 6 weeks and particularly last week.

There were other factors, however, and PAW officials estimated that in recent weeks gasoline consumption in District 1 had been close to 500,000 bbl. per day while deliveries were only around 350,000 bbl. per day, resulting in a rapid depletion of stocks. Early in November PAW (then the Office of Petroleum Coordinator) asked OPA to adjust its ration system to reduce gasoline consumption by 80,000 bbl. per day. The only action taken was to cut the value of "A" coupons from 4 gal. to 3 gal., resulting in a saving of some 20,000 bbl. per day. Another factor was that when commercial vehicles were changed to "T" coupons, a large number of "S" coupons were outstanding and were turned in for gasoline (some of them via bootlegging devices), which caused a much heavier demand for gasoline than the ration system contemplated. Abuse of "B" and "C" cards and their liberal distribution by many local ration boards were other factors contributing to the excess of rationed demand over supply.

In announcing resumption of gasoline sales, OPA Administrator Henderson said that the reduction in the values of "B" and "C" cards was estimated to reduce consumption by some 25,000 bbl. per day. Since this is less than half the saving PAW said was necessary some weeks ago it is likely that further cuts must be made before long in District 1 consumption.. Mr. Henderson said immediate steps would be taken to tighten up the rationing system in many ways, including strict enforcement of the regulations regarding use of "T" coupons for commercial vehicles, punishment of dealers and motorists violating regulations, new controls over inventories of primary suppliers, review of methods of supplying bulk plants and tighter control over them, requesting military authorities to use greater care in the use of passenger cars controlled by them, and closer inspection of eastern dealers by a force of 800 OPA inspectors.

PAW took its first action under the powers given it by the president's recent executive order and officially informed OPA and the War Production Board of the anticipated supplies of petroleum products in District 1 until February 1, requesting these agencies to take action in accordance with these estimates.

In District 1 there will be available for distribution during the remaining days of December and during the month of January 1943 the following volumes expressed in barrels per day:

Products—	December (Remainder)	January 1943
Motor fuel	365,000	331,000
Kerosene	184,000	167,000
Distillate fuel oils	340,000	338,000
Residual fuel oils	282,000	281,000
Total	1,171,000	1,117,000

These figures are exclusive of aviation gasoline and petroleum for export.

Commenting upon the effect of these supply determinations, Deputy Administrator Ralph K. Davies said:

"This supply represents all that can safely be made available over the period considering transportation facilities and inventory position. Even this is not guaranteed. Military demands must come first. We have met them in full to date and we must continue to do so. If we should be called upon between now and January 31 for any large volume additional to the amounts which the military forces have notified us will be required, then the figures now issued would need to be revised downward. The forecasts are based upon the best information available at present.

Recent Demand Must Be Curbed

"The supply position as now determined provides sufficient petroleum products to meet in full all military orders, to keep war industries supplied, and to meet minimum requirements for home heating throughout the Atlantic seaboard area. It is likewise sufficient to provide for essential motor-car use though it is not sufficient to meet the recent rate of gasoline consumption. Lesser quantities of gasoline must suffice if we are to meet more critical military, industrial and home-heating demands."

Chronologically, the critical East Coast supply situation began with a visit to New York about the middle of last week by Petroleum Administrator Ickes and aides in answer to a call declaring that stocks were at a 1-day demand level.

When Mr. Ickes returned, he reported to other controlling agencies, and the result was the order invalidating, temporarily, all "A," "B" and "C" cards in the eastern states. It was effective Friday noon.

Meanwhile, President Roosevelt asserted that the sudden shortage on the East Coast was caused by a sudden, hurry-up call from North African fighting forces. This was at his Friday press conference.

The president's assertion that a sudden demand from the African front was the reason for the situation at present was variously interpreted. One source said that a large convoy of tankers, carrying both crude and refined products, destined for East Coast terminals and refineries, had been diverted to the African bases before having a chance to reach New York, Philadelphia, Norfolk, Charleston and other ports. Another said that products in storage at these and other terminals had been taken by the armed forces for shipment by convoy to Africa.

STATE CAPITALS...

East Texas Salt-Water Developments Chief Topic at State-Wide Proration Hearing

By HARRY F. SIMONS

AUSTIN, Tex.—The East Texas salt-water situation, a topic which has caused much discussion and dissention in the past few months, bobbed up at the Texas state-wide hearing December 16 to enliven what was otherwise a routine session. Principal reason for the indifference was the lack of a certification from the Petroleum Administration for War as to what the state's allowable would be for January. This was due to the state-wide hearing being held earlier than usual.

The meeting was held up pending the arrival of a train bringing many oil-company representatives. While waiting, Mr. Jester was elected chairman for the next 2 years. Commissioner Olin Culberson moved the election and Col. Thompson seconded.

A request for 5,000 bbl. more crude from the Gulf Coast for January and 10,000 over December for February was made for the Humble Oil & Refining Co. by its spokesman, Rex Baker. This oil will be needed to supply the demand for East Coast delivery to be shipped through Pipe Line Project 1 which will go into operation the latter part of January or the first of February. Completion of this project will allow the delivery of 20,000 bbl. more to the East Coast by pipe line. Reversal of the Tuscarora line through Pennsylvania, along with the reshuffling of lines in the Southwest and Mid-Continent make this project possible. Humble has also been requested to increase its runs of aviation gasoline (91 and 100 octane) at its Baytown refinery by 10,000 bbl. per day.

Neath Presents Statement

Some effects of the operation of the East Texas-Norris City leg of the 24-in. pipe line were given in the statement by J. A. Neath, also of Humble, who reported that his company had been ordered to prepare to deliver 22,000 bbl. of No. 2 heating oil to the 24-in. line beginning January 15. To relieve the heating-oil situation on the East Coast, the line will start operation on 125,000 bbl. of No. 2 fuel and approximately 175,000 bbl. of crude oil daily. The Pan American pipe line will carry the heating oil from Humble's Baytown refinery to Longview.

The East Texas salt-water situation was clouded. The only one thing definite was the announcement that the order limiting salt-water production to 10 bbl. for each barrel of oil would become effective on January 12. The tests being made by the Railroad Commission's engineers on 129 wells in the field will be completed by January 1.

Olin Culberson who previously stated he felt the water-oil ratio rule violated the legislative intent of the Marginal Well Law restated his opposition and criticized the order.

A delay in applying new restrictions to East Texas was asked by H. P. Nichols, executive vice president of the East Texas Oil Association and R. F. Morgan asked the commission to reconsider and place in effect the transfer-allowable plan. Fred Weeks, Tyler attorney, asked the commission to hold another hearing on the plan and to not attempt to enforce the order until its legality had been established.

Company Alters Plans

Bryan Payne, Tyler, president of the East Texas Salt Water Disposal Co., announced that the company had altered its plans to take care of more salt water in the near future and that by February 1 his organization would be injecting 120,000 bbl. back into the Woodbine sand in addition to the 80,000 bbl. being put in by company systems now in operation. The disposal company is now injecting 25,000 bbl. daily and by January 1 will be putting back 60,000 bbl. daily. Difficulty in getting adequate priority ratings to obtain asbestos pipe was causing some delay and plans for an extensive gathering system with disposal wells located outside the field were abandoned and 10 wells within the pool selected for injection purposes. Mr. Payne suggested trying the allowable-transfer plan for a time to see how it would work out.

Whether the injunction suits now pending in the District Courts at Austin would or would not come to trial before or after January 12, remains a question. While Mr. Culberson has expressed himself as believing the rule may be contrary to the marginal-well law, the other two members of the commission feel that it does not conflict and that they acted within the powers of the commission.

Effect on the East Texas of restricted fluid withdrawals during November was shown by announcement at the hearing that the bottom-hole-pressure had increased 0.88 lb. per square inch to 1,017.12 lb. on December 1. Allowable for the period was 10,722,720 bbl., a daily average of 357,424 bbl.; the pressure increase per 1,000,000 bbl. withdrawal was 0.082 lb. per sq. in. J. K. Baumel, director of production for the Railroad Commission, testified at the hearing that unless the water production was curtailed, the bottom-hole pressure would show a 15-lb. per sq. in. drop such as occurred during October.

Many have anticipated that as soon as the 24-in. line goes into operation, the East Texas field will be called upon for a substantial oil production increase immediately. Actually it may be a number of months before East Texas production will need to be increased due to the amassing of approximately 20,000,000 bbl. of oil in storage at points convenient to the line.

Amount of empty storage in Texas was given in a statement read into the record by Colonel Thompson. The figures were taken from data supplied the commission and were an estimate.

ESTIMATED EMPTY STORAGE IN TEXAS

	Barrels
Total storage capacity at refineries	125,561,000
Oil and products in tanks	72,118,000
B. s. & w.	257,000
Total material in tanks	72,357,000
Empty at refineries	53,186,000
Total capacity pipe-line tank farms and terminals	142,933,000
Oil and products in tanks	71,616,000
B. s. & w.	4,609,000
Total material in tanks	76,225,000
Empty at pipe-line tank farms and terminals	66,708,000
Total empty storage	119,894,000

Most of this empty storage will be used for holding motor fuel produced incidentally to the manufacture of aviation gasoline.

Beauford H. Jester, Corsicana, last week became chairman of the Texas Railroad Commission, succeeding Col. E. O. Thompson

ARKANSAS

GAS DISTILLATE fields in the state were ordered shut in March 1, 1943, by the Arkansas Oil and Gas Commission. The fields will remain closed until construction can be completed on treating plants which remove the hydrogen sulfide from the gas. McCamie, Texarkana, Macedonia and Dorcheat (Cotton Valley and lime) pools are affected. The sweetening plants are scheduled for completion in June. Operations in the field will not be changed until March 1.

Daily allowable for the state was fixed at 75,564 bbl. in January by the commission with uncontrolled pools getting 23,999 bbl., and the controlled fields 47,024 bbl. of oil and 4,541 bbl. of distillate.

OKLAHOMA

THE STATE-WIDE PRORATION HEARING at which evidence will be taken for the January allowable order is scheduled in Oklahoma City December 30. Producers and operators will hold a preliminary meeting at 10 a.m. and will assemble with the Corporation Commission at 11 a.m.

The OIL AND GAS JOURNAL

PRODUCING REFINING NATURAL GASOLINE PIPE LINE

Published weekly by The Petroleum Publishing Company at Tulsa, Oklahoma

A Fateful Christmas

We are about to celebrate the most fateful Christmas of this generation, one of more importance to more people than any that has preceded it.

The spirit of Christmas above everything else is that of gratitude and understanding and best wishes for those around us as a new year approaches. Amid the shadows of a world conflict, it is more important than ever before that these qualities of good will be fostered.

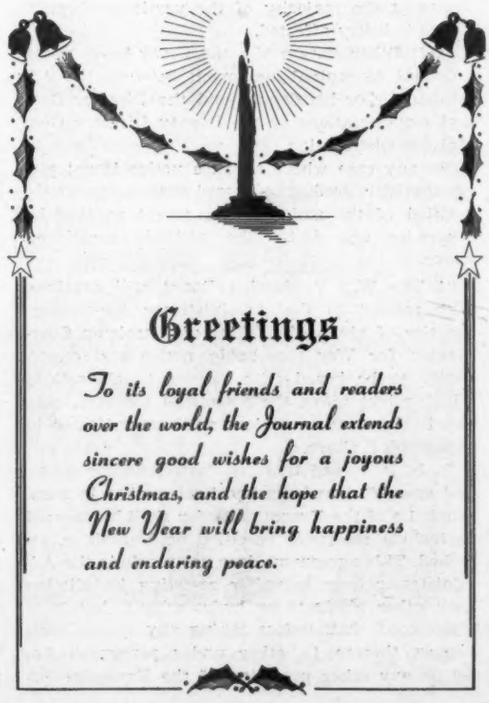
Recent weeks have again witnessed the turn of the military tide in favor of free peoples, including millions among the enemy nations who will leave the paths of regimentation directed by a ruthless leadership when given the opportunity.

The accomplishment of an enduring peace, under principles of the brotherhood of man first established by Him whose birth is now being celebrated, will be a continuing responsibility of the victors.

Before peace there is a difficult and possibly a long road of hardship and sacrifice yet to travel which will tax the strength of this nation and its allies as never before. Thus, it is fitting at this time for the petroleum industry to take stock of what it has done and what it will do in the still more trying but destiny determining days ahead.

We salute the tens of thousands who have gone from the fields, the plants, the pipe lines, the service stations, and the offices to aid directly in taking the war to the enemy. They have carried the aggressiveness and sturdiness of an independent and courageous industry into the military and their services are being utilized on every front.

As to those at home, a year of war has definitely established that the oil industry will have to carry on practically all of its peacetime operations plus numerous wartime activities throughout the emergency. This means that the petroleum business has shouldered what will be the greatest single industrial responsibility of 1943 in support of the war.


Greetings
To its loyal friends and readers over the world, the Journal extends sincere good wishes for a joyous Christmas, and the hope that the New Year will bring happiness and enduring peace.

Our New Package

We, of this publication, like to feel that we have done our part in reporting and analyzing the activities of one of the war's most essential industries. As a further contribution, in accordance with the announcement of last week, the Journal shall be published in standard size starting January 7. This will aid in the conservation of paper and of critical materials and in shipping space. The entire program is in conformity with the main war objective for civilians of "doing more with less."

Our editors are enthusiastic regarding their opportunities with the new package. They will be busily engaged through the holiday season in completing their plans. The additional pages that will be provided will enable them to include new features. The new format will make possible a concise, yet complete handling of engineering, field, economic, and news articles. The continuity and arrangement of all material will give increased value to the reader. Hundreds of our friends throughout the industry have expressed their appreciation of the new size and its greater convenience.

We, too, feel that we are geared for war. We pledge every publication facility that we have to the united efforts of the oil industry looking toward a quick and complete victory.

Procedure for Fitting Oil Into CMP Under Discussion

WASHINGTON, D. C.—Definite procedures for allocating steel and other critical materials to the oil industry may not be worked out finally for some time, although the problems involved are under continual discussion between officials of the Petroleum Administration for War and the War Production Board.

PAW has been designated as a "claimant agency" under the Controlled Materials Plan and a general agreement on jurisdiction has been reached between Harold L. Ickes and Donald M. Nelson, but many details still remain to be worked out.

CMP will start to function January 1 when the various claimant agencies begin to submit their bills of materials on which allocations will be made for the second quarter of 1943. In many cases preliminary estimates will have to be submitted in lieu of detailed bills of materials. In addition to PAW, the following agencies have also been designated as claimant agencies: Office of Defense Transportation, Office of the Rubber Director, National Food Administrator, National Housing Agency, and the Construction and Facilities Committee. All these six originally were intended to clear through the Office of Civilian Supply, which is a claimant agency, but it was decided that materials which must be allocated functionally should be handled by separate agencies.

The Controlled Materials Plan, into which this story tells how the industry's equipment requirements are being fitted, is considered the most progressive step taken since the emergency developed.

WPB-PAW Relations Fixed

A memorandum signed by Messrs. Ickes and Nelson outlines the procedure to be followed by the two agencies in dealing with problems which might concern both, and defines the jurisdiction of PAW over petroleum products which are handled to some extent by the Chemical Branch of WPB. The text of this memorandum is as follows:

"This will confirm our mutual understanding as to the relationship between the Petroleum Administrator for War and the War Production Board in connection with the responsibilities delegated to the Administrator under Executive Order 9276 dated December 2, 1942.

"1. Pursuant to the Executive Order, the Administrator will issue in his own name directives and orders to the petroleum industry. In order to avoid confusion with actions of the War Production Board, all actions taken in the name of the Administrator will be designated as 'Petroleum Directives' or 'Petroleum Administraive Orders.' Such actions will be confined in subject matter to the production, refining, treating, storage, shipment, receipt and distribution within the industry of petroleum, petroleum products, or associated hydrocarbons, as defined in the Executive Order.

"2. The Administrator may also take action (to the extent specified in paragraphs 3.c(2) and 3.d of the Executive Order) with relation to the distribution within the petroleum industry of material or products other than those specified in paragraph 1 of this letter, including the granting or denial of priority, allocation or preference rating assistance to the industry. Such actions will be subject to program determinations and other directions of the chairman of the War Production Board, will be issued in the name of the Director General for Operations of the War Production Board, and will conform as to form, language and general arrangement with the other regulations, orders and directions issued by the War Production Board. The Director General will delegate to the Administrator the authority to affix his signature to such documents, subject only to the notice and consultation specified in paragraph 3 below. Such documents will, in addition, be countersigned by the Administrator so that industry will be able to distinguish between actions originating in the War Production Board and those originating with the Administrator.

"3. The Administrator will give the War Production Board reasonable advance notice and opportunity for consultation before issuance, with respect to all actions to be taken by the Administrator of the kinds described in paragraphs 1 and 2 above, with the following exceptions:

"(i) In case of an emergency the Administrator may proceed without such notice and opportunity for consultation.

"(ii) The Administrator, without notice to the War Production Board, may take any action affecting not more than two members of the petroleum industry, unless such member or members represent the majority of the particular branch of the industry affected.

"(iii) Other classes of actions may be excepted pursuant to mutual agreement between the Administrator or his deputy and the Director General for Operations or the Deputy Director General for Distribution.

"In any case where advance notice is not given, the War Production Board shall be promptly notified of the action taken, except as may be otherwise agreed by the officials mentioned above.

"4. The War Production Board will continue with respect to the Administrator its present practice of giving the Office of Petroleum Coordinator for War reasonable notice and opportunity to be heard with respect to all actions which might affect the petroleum industry, subject to the same exceptions as those indicated in paragraph 3 above.

"5. It is agreed that the 'petroleum products, and associated hydrocarbons' referred to in paragraph 1.a of the Executive Order shall be deemed to include the items specified on Exhibit A, attached. This agreement does not preclude the Administrator from hereafter asserting jurisdiction over other products or hydrocarbons, but it is understood that, before taking any action with respect thereto (whether under paragraph 3.a, 3.d or any other provision of the Executive Order), he will notify the War Production Board at least 5 days in advance of the proposed action.

"6. The Administrator will provide for the enforcement of all directives and orders issued pursuant to paragraph 1 of this letter.

"7. As promptly as time permits, those War Production Board orders which come within the provisions of paragraph 1 of this letter will be reissued by the Administrator, and the War Production Board will revoke such superseded orders. This includes orders L-70 and all orders in the M-68 series.

"Upon confirmation by you, the terms of this direction will be made available to the staffs of the Administrator and the War Production Board as a guide for operating procedures and may be subsequently incorporated in an appropriate administrative order. Procedures for giving the notices referred to above will be worked out between your office and the Deputy Director General for Distribution, and arrangement will be made so that a single official in each office is designated as a liaison for this purpose. In any case, written concurrence will not be required prior to action; the office objecting to the proposed action will have the affirmative responsibility of presenting its objections to the other office.

"Additional procedures for the presentation of the petroleum industry's requirements to the War Production Board are, as you know, now under discussion, and for this reason I have not attempted to incorporate them in this direction."

Exhibit "A"

Acid oil, alkylate, antiknock compound, aromatic solvents (refinery conversion projects for production of) asphalt, benzene (refinery conversion projects for production of) bunker fuel oil, butane, butadiene (refinery conversion projects for production of) butylene (refinery conversion projects for production of) carbon black (natural gas or petroleum production for) codimers (refinery conversion projects for production of) crude petroleum, cumene, diesel oils, diisobutylene (refinery conversion projects for production of) distillates.

Ethyl benzene (refinery conversion projects for production of) ethylene (refinery conversion projects for production of) fuel oils, gas, natural (production, gathering, treating), gasoline, aviation; gasoline, ethyl, natural, casinghead, octane; gasoline, 91-octane, 91-99 octane, 100-octane and over; hexane, hydrocodimer, illuminating oils, isobutane, isobutylene (refinery conversion projects for production of) isooctane, isopentane.

Isoprene (refinery conversion projects for production of) kerosenes, lubricating greases, lubricating oils (products of petroleum refineries), motor fuels (produced or derived from petroleum or natural gas), naphthas, paraffin wax (production of), petroleum coke (production at petroleum refineries), propane, propylene (refinery conversion projects for production of), residual fuel oils, residuum, toluene (refinery conversion projects for production of), tops, white oil, and xylene (refinery conversion projects for production of).

Refineries must *run*

This war is being fought in American refineries no less than on the battlefronts all over the world

That fact is emphasized by two statements that were made in a paper presented before the refining division of the American Petroleum Institute in Chicago, November 12

The first statement was: "Most of our refineries simply *must* continue to run if the war is to be won"

The second urged refiners to use "more ingenuity to force the maximum war products out of old equipment"

Refineries must run for all they are worth to produce 100-octane aviation gasoline, butadiene, and styrene for synthetic rubber, toluene, fuel oil and coke—at the expense of motor gasoline

And it's important to get the greatest possible yield of these war products from old equipment to conserve scarce materials, manpower and time

U. O. P. processes that were the backbone of the refining industry are now enlisted for war production and the know-how of Universal refining specialists is enlisted to make them work their best

OIL IS AMMUNITION—USE IT WISELY

Universal Oil Products Co
Chicago, Illinois

Dubbs Cracking Process
Owner and Licensor

THE REFINERS INSTITUTE OF PETROLEUM TECHNOLOGY

Stronger Enforcement Policy In California Is Outlined

By L. P. STOCKMAN

LOS ANGELES, Calif.—It had been expected that Ralph K. Davies would be able to attend the all-day meeting of the Production Committee for District 5 here December 16, but at the last minute he found that he could not be present. He sent out the paper which he had expected to deliver in person and it was read for him. Mr. Davies brought out the fact that the Petroleum Administration for War will in the future crack down on violators of the conservation program in California and that the program henceforth would operate under directives and not on the voluntary basis as has been the case for some time.

With reference to directives, Mr. Davies stated. "In California the road has been cleared for a proper application of the Executive Order by the excellent work of the Production Committee for District 5 which has operated under the Co-ordinator's Recommendation 19 in preparing for his direction allocations of current crude production from oil wells and fields in California. In this effort, the Production Committee has built upon the prior work and had the appropriate financial and mechanical assistance from the Conservation Committee of California Oil Producers. Month by month the resulting schedules have been issued over the signature of the coordinator. It is our intention that this should continue, only now these schedules will become directives with the force of the new executive order behind them. A few instances have occurred where an individual operator has deliberately placed private profit above the needs of the nation. In the future, under the powers granted in the executive order, the Petroleum Administration can and will protect the overwhelming majority who are complying with the allocation schedules by issuing suspension orders against any few who flagrantly ignore proper rates of production."

Prepared to 'Crack Down'

In essence this means that if those few individualists continue to overproduce in violation of curtailment or conservation the Petroleum Administration will crack down hard. Up to the present it has been difficult to exact compliance with allocation schedules but now the administrator has authority to force suspension through court action if necessary.

Mr. Davies also recognized the fact that California's so-called book potential production does not exist in fact. He declared that "the most careful studies by thoroughly competent production experts today indicate that the oil fields of California, capable of producing the required crudes, are now being operated at maximum efficient capacity. The best judgment of these experts is that 750,000 to 800,000 bbl. per day is probably as much as can be expected from known reserves in California over any extended period of time. To have corrected misconceptions of the past as to the sustained productive capacity of California reserves is a prerequisite to straight thinking and practical action."

D. R. Knowlton, who attended the meeting, made some interesting and pertinent remarks one of which brought smiles to those in attendance. This was when he made the statement that, "Although 1943 will probably see less drilling throughout the United States, I am hopeful there will be more drilling in California. Steps have been taken and will be taken to insure the availability of materials for drilling of the wells we need." The smiles faded a little later when he said, "The second step which will be taken to insure, if possible, that material is available for drilling needed wells, will be the issuance of an order which will prohibit all drilling except upon a 'certificate of necessity' from the Petroleum Administration for War. The principal purpose of superimposing this control over the existing M-68 program is to prevent the consumption of existing warehouse stocks in the drilling of wells in areas where the present productive capacity is adequate, and will be adequate for some time to come, and where transportation facilities are lacking."

This certificate of necessity is objectionable to most California operators for the simple reason that the Petroleum Administration for War will have sole authority to determine whether an operator may or may not drill a well or series of wells.

Mr. Knowlton also would like to see some experimenting done with gas or water injection but it is not likely that any great amount of work along this line will be done in the immediate future. He stated, "I would like to see some experiments carried on in some of these California fields with thick sand bodies and low-gravity oil to see what can be done with gas or water injection. I recognize that there is no abundance of gas in California; however, the results from gas injection in some of the fields in California may justify the use in spite of the scarcity."

While commenting on natural gas it might be mentioned that gas waste in California at the present time is 2.88 per cent, the lowest waste recorded since 1929. L. A. Cranson, chairman of the gas committee, which committee has now been made permanent, reported to the general meeting of operators that considerable strides have been made within the past 30 days in reducing gas waste through the shutting in of high gas-oil ratio wells, the rearrangement of pipeline outlets and the installation of small pipe lines to take small quantities from wells. At Wilmington the gas blow last August was 2,270,000 cu. ft. per day and although crude-oil production of the field has been almost doubled, present blow has been reduced to 1,170,000 cu. ft. Wilmington wells do not make much gas with the crude oil produced and the amount reported as being wasted represents the cumulative affect of a great number of wells blowing a very small amount daily.

The day session was presided over by E. E. Pyles, chairman of the production committee for District 5, and in his comments he indicated that it was hoped an order could be obtained requiring every operator to report gas production and disposition to the production committee office monthly. He thought that this would enable the committee to analyze conditions and probably recommend some method of reducing waste. Mr. Cranston called attention to all districts where there is some degree of gas blow and explained what is being done. He said that the gas companies in the Coalinga Nose field were opposed to taking gas from that field because of the sulfur it contained, but stated he expected the gas problem at Coalinga would be solved within another 30 days.

The problem in the Santa Maria Valley presents a difficult problem due to inadequate pipeline outlets but gas waste had been reduced by converting two refineries from oil to gas consumption for boiler feed. Waste in the Cato Ridge field had been reduced by shutting in two high gas-oil ratio wells with the result that there is little or no blow at present. Indicative of the improvement in gas waste is the fact that waste in 1930, approximated 39 per cent, dropped to 7.3 per cent in 1935-39, and at present is 2.88 per cent.

L. L. Aubert reported on activities in connection with the joint use of facilities and equipment in all branches of the industry and hoped to have a final report within the next 30 days.

Representative Fields Surveyed

In the production end of the program the committee selected four fields as representative of other fields throughout the state and made a survey of each. Ben Parsons made the survey on Santa Fe Springs, considered a typical Los Angeles Basin field; R. D. Montgomery took Elwood which was selected because it is a typical unit and contains a tideland accumulation; Ross Mc Collum took over the survey on the Kern River Front field which was considered a typical shallow pumping field in the San Joaquin Valley, and William Keck took over the survey on Rio Bravo and Greeley which represented deep-seated flowing fields.

These studies were made to study the possibility of consolidating all forms of transportation, production, pumping equipment and other facilities and personnel. The entire problem will require another month but at the conclusion of work the committee will have a clear picture of what to recommend for future operation.

C. L. Moore discussed reclamation of production equipment and urged that operators determine what can be salvaged and that it is also important to find out if anything can be salvaged.

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Mid-Continent Association Officers Are Reelected

J. C. Hunter, Abilene, Tex., was reelected president of the Mid-Continent Oil and Gas Association at the annual meeting of directors in Tulsa last week.

George C. Gibbons, executive vice president, Texas division of the association, Dallas, was elected first vice president of the general group, succeeding Gov.-elect Robert S. Kerr of Oklahoma. The office of chairman of the board, formerly held by J. D. Collett of Fort Worth, Tex., deceased, was abolished.

Other officers were reelected.

Fain-McGaha Corporation Completes Sale to Shell

Shell Oil Co., Inc., last week completed the transaction by which it acquires the stock of the Fain-McGaha Oil Corp., Wichita Falls, Tex. The consideration was reported to be in excess of $3,000,000. The Fain-McGaha corporation was organized in 1927.

A partnership was formed by Charles P. McGaha and Lamar D. Fain to acquire and operate the corporation properties not sold to Shell. The Shell company then acquired the stock of the Fain-McGaha corporation.

to Free Men Throughout the World

A Christmas Message

On this Christmas Day, we of Clark Bros. Co. extend greetings to the fighting men of all the United Nations, ashore and at sea, at home and abroad.

We want you to know that our thoughts, our hopes and our prayers are with you today, guiding our actions and spurring us on to meet cheerfully any demands that may be made upon us.

Above all else, we ask you to accept this solemn promise: Never for a moment shall we at home lose sight of the obligation that we owe to those on the firing line. Collectively and individually we pledge ourselves never to let you down by falling up in our production of the materials you need to wage a winning fight.

With you, we look forward to a happier Christmas in the not too distant future. And like you we believe that the more successfully we fight the war, the quicker the return of the kind of holidays we used to know.—The Men of Clark Bros. Co., Inc., Olean, N. Y.

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Federal Order Digest

WPB Preference Orders

UTILITIES—P-46-b, amended: Relaxes prohibition against installation of service lines to dwellings, providing new occupant owns range requiring fuel other than that already available, effective December 16.

AGAVE FIBER AND CORDAGE—M-84, amended: Permits use of agave fiber and cordage for spinning lines and drilling cables, effective December 16.

STEEL—M-21-a: Sets up complete control over production and delivery of carbon steel made in electric furnaces, effective Decmbr 16.

STEEL—M-21-h: Controls production of carbon and alloy tool steels and provisions formerly contained in M-21-a relating to tool steel and the entire order M-14, were revoked, effective December 16.

Limitation Orders

USED MACHINES—L-83, Interpretation 1: Provides that the value (selling price) of a used critical industrial machine shall include the cost of such repairing and reconditioning as is necessary to make the machine an effective instrument. Thus sales below the order's price limitation is no violation, effective December 17.

FURNACES—L-22-a: Stops all further production of steel furnaces for direct-fired air heating systems except for urgent military needs, effective December 31.

General Policies

COMPLAINT OFFICE: Establishes WPB department to handle complaints about its questionnaires, under direction of James Clay Woodson.

ALCOHOL PLANTS: Projects engineering details in advance of actual need by Chemicals Division, WPB.

FUEL OIL: Provides that home owners may validate use of later coupons for immediate purchases, if they show critical need for replenishment.

CERTIFICATES OF WAR NECESSITY: ODT urges truck owners to request adjustments in certificates through local offices, if allocations are insufficient to conduct essential functions.

Transportation

TANK CARS—ODT 7, revised: Lays down specific regulations governing movement and handling of petroleum tank cars, limits loading and unloading time, arranges for closer check on all facilities, effective December 12.

Government May Own All Oil in WEP 24-in. Line

By HENRY D. RALPH

WASHINGTON, D. C.—Details of a plan for operating the War Emergency Pipelines, Inc., 24-in. crude-oil line between East Texas and Illinois are now being perfected by the Petroleum Administrator for War and subsidiaries of Reconstruction Finance Corp., such as Defense Plant Corp. and Defense Supplies Corp.

According to plans discussed, it is reported that War Emergency Pipelines, will operate the line as agent for Defense Plant Corp. which owns it 100 per cent. But WEP will have nothing to do with the source or disposition of the oil. As a result, the line would have a rather unique status since, strictly speaking, it would be neither a common nor a private carrier but it will represent something in between. DPC or DSC will buy oil in Texas and sell it at Illinois tank-car terminals, while PAW will determine the sources of the crude and fuel oil in East Texas and will allocate its rail deliveries in the East. One official described the plan as making the line practically a continuous tank farm from Texas to Illinois but he said that final details have not been worked out sufficiently to permit a full explanation of operation.

It appears that an arrangement may be worked out by which DSC will lease the WEP 24-in. pipe line facilities from DPC. As a result, DSC would be the sole shipper utilizing the line.

On the final completion of the 24-in. line to the East Coast in the first half of 1943, the set-up would provide for having DSC buy petroleum and petroleum products entering the line at Longview. Those selling crude oil or products at Longview would be entitled to repurchase the same amount of crude and products at the eastern terminals of the line, except where conditions may arise which would require some modification in order to further the war effort.

A committee headed by H. L. Phillips, vice president, Consolidated Oil Co., as chairman, and including J. L. Latimer, manager, Magnolia Pipe Line Co.; C. M. Rosebrugh, chief engineer, pipe line division, Gulf Refining Co., and B. E. Hull, president, Texas Pipe Line Co. and vice president and general manager of WEP are concerned with arrangements for handling shipments of oil through the line.

It has been emphasized that the purpose of the program is that WEP facilities should be utilized to relieve shortages of petroleum and petroleum products in District 1. Loss by enemy action and diversion to war purposes of tankers normally used for transporting petroleum and products from Gulf ports to the East Coast caused DPC to construct the WEP project to meet conditions.

When the federal Government deprived the oil companies of the use of tankers needed for the war effort an arrangement was made for reimbursing companies in cash for the increased expense of moving crude oil and products to the East Coast by railroads. Moving of shipments through the 24-in. line will be economical. Transportation of petroleum at the rate of approximately 300,000 bbl. daily through the WEP line will mean that reimbursements or subsidies will be much reduced which the federal Government is obliged to make to oil companies.

DEATHS

BERT L. KLINE, 62, retired employe of United Natural Gas Co., died at his home in Van, Pa., last week. He had resided at Van since his retirement last August. His widow, a son and a daughter survive.

EDWARD R. ATWILL, 73, secretary and purchasing agent for Bareco Oil Co., died at a Tulsa hospital last week after having undergone an operation. He had been in apparent good health until about 10 days before he died. Mr. Atwill had lived in Tulsa since 1929, and before coming to Tulsa was associated with Pierce Fordyce Oil Co. in St. Louis, Mo. A daughter survives.

H. J. PITTS, 81, died at his daughter's home in Shreveport, La. Mr. Pitts had been associated with Texas Co. for 20 years prior to his retirement. He had lived in Oil City, La., for 30 years. Two daughters and two sons survive.

DEE ELBERT HUMPHREY, 59, of Dallas, Tex., died at a Dallas hospital last week after an illness of several weeks. He had planned a business trip to Mexico just before he was stricken ill with pneumonia. Mr. Humphrey has followed the oil business along with several other business interests. He had lived in Dallas for 35 years. His widow and two sons survive.

P. G. McKEON, 69, pioneer Tulsa oil man, formerly associated with the Barnsdall interests in Pittsburgh, Pa., died last week at his home in Tulsa. Mr. McKeon moved from Pennsylvania to Bartlesville, Okla., in 1910, and was affiliated with Quapaw Oil Co., and later the Wichita Oil & Gas Co. He came to Tulsa in 1916, and became an independent operator. He retired from active work in 1926 to look after his properties. A son survives.

ARTHUR E. PARKER, 45, of the Texas Co., Fort Worth, Tex., died of a heart attack in the company's Fort Worth office, last week. He had been in the accounting department for a number of years and had been with the Texas Co. for the past 23 years. His widow and a daughter survive.

BRUNO PAUL STEINHAUSER, 34, a pumper for the Minard Run Oil Co., died in an Olean, N. Y., hospital, last week. He had lived in Lafayette, Pa., for 6 years. His widow survives.

JOHN ALBERT BECK, 58, president of Pennsylvania Refining Co., Karns City, Pa., died suddenly at his home in Karns City, Sunday night. Mr. Beck became associated with the company in 1903. He was also a director of the Pennsylvania Grade Crude Oil Association; the National Petroleum Association; Mid-Penn Refining Co.; Trans-Glenn Oil Co., Leechburg, Pa.; treasurer of Pennsylvania Coal Products Co., Petrolia, Pa. He was also president of Ridgeview Country Club, and was affiliated with a number of Masonic bodies. He leaves a widow and seven children.

E. C. LANE, 62, a chemist with the Bureau of Mines, died of a heart attack December 18, at his home in Bartlesville, Okla. He had been in the service of the bureau since 1919, first in San Francisco, Calif., and since 1924 at the petroleum experiment station in Bartlesville. Prior to joining the Bureau of Mines he had had wide experience both in teaching and in the industry. He is survived by his widow.

J. M. RUSH, 52, pioneer Mid-Continent oil man, died at his home in Dallas, on Monday. He had been an independent operator and drilling contractor in Texas, Oklahoma and New Mexico. In recent years he has used an airplane to travel about his extensive operations. His widow and two daughters survive.

Natural Gas News

Restrictions on New Gas Lines Relaxed in Order P-46-b

WASHINGTON, D. C.—Restrictions on the construction of utility lines to furnish gas or electric service to domestic ranges are relaxed in Supplementary Preference Rating Order P-46-b as amended December 16 by the War Production Board.

Previously, if the owner of a gas range moved into a house wired for an electric range, or if the owner of an electric range moved into a house piped for gas, it was necessary for the owner to acquire the type of range that would operate on the service already brought to the house.

This was changed to permit a utility to bring gas or electric service to the house to serve either a gas or electric range, provided the dwelling is not already equipped with a range of any kind. This is allowed, however, only when a person moving from one house to another already owns a range which he is taking with him.

There is a limit on the amount of critical material which may be used. In the case of a gas range, the connection may not require more than 75 ft. of 1¼-in. steel pipe or its equivalent in other sizes.

First Gas Proration Order In Oklahoma Is Accepted

OKLAHOMA CITY, Okla.—State-regulated production from the West Cement, Chickasha and East Cement gas fields will start January 1, 1943. Details of the proration order, the first issued for major gas fields, remain to be determined but operators and representatives of the Corporation Commission have agreed on basic provisions.

The agreement provides that the proration order will be reviewed at hearings each month before the commission to determine how much gas each well will be allowed to produce.

A technical formula for determining the amount of gas to be produced from each well has been agreed upon and will be incorporated in the proration order. The commission will make no effort to fix the price of gas at the well.

Eight Midwest Gas Companies Asked to Pool Facilities

Eight natural-gas companies operating in the Middle West last week were asked to pool their facilities to alleviate threatened shortages. W. A. Lyons, chief of the supply allocations section, War Production Board Power Division, Washington, presided at a meeting of gas company representatives in Chicago December 16, and this was followed by another discussion in Kansas City, Mo., December 18.

Under the proposed plan, the gas resources of the entire Midwest would be consolidated so that surpluses in one area could be made available to others.

The WPB representatives at the meeting contended the arrangement was necessary to assure sufficient fuel for steady war production.

The proposed pool would be made up of the following companies:

Natural Gas Pipeline Co. of America, running from the Amarillo, Tex., fields to the Chicago area.

Chicago District Pipe Line Co., which receives its gas supply from the Natural Gas Pipeline Co. of America.

Panhandle Eastern Pipe Line Co., which runs from Amarillo to Detroit.

Consolidated Gas Utility Co., which operates out of Amarillo field into Oklahoma and Kansas.

Oklahoma Natural Gas Co., which serves most parts of Oklahoma.

Kansas Power & Light Co., which runs from Hugoton (Kansas) field to Minneapolis and St. Paul.

Union Gas Co., operating in Kansas.

WPB spokesmen said the plan—a WPB directive which requires approval of the companies to become operative—had been worked out with the cooperation of other governmental fuel agencies, including the Office of Solid Fuels and the Petroleum Administration for War, with the approval of Army and Navy representatives.

Sour-Gas Treating Plant Proposed for Arkansas

A proposal to build a gas-sweetening plant in the Texarkana field in Arkansas was presented to the Arkansas Oil and Gas Commission last week by W. A. Delaney, Jr., of Ada, Okla. The plant would cost approximately $250,000 and would remove the hydrogen sulfide from gas produced in the field so that it would be suitable for commercial sale.

Louisiana-Tennessee Gas Line Opposed

NEW ORLEANS, La.—Opposition to the proposed line from Southwest Louisiana to the Tennessee Valley Authority region was opposed last week by Gov. Sam Jones of Louisiana. A hearing will be held before the Federal Trade Commission at Nashville, Tenn., on January 18, 1943, on the application by the Tennessee Gas & Transmission Co. to contruct the line. Governor Jones' opposition to the line was based on its reducing the supply in the area to the point where it affected industry with a shortage.

Natural Gasoline

Natural-Gasoline Production Continues Upward Trend

Production of natural gasoline continues an upward trend which has been maintained almost continuously throughout the year. The Bureau of Mines last week reported October production of natural gasoline and related products to have averaged 234,000 bbl. daily compared to 233,000 bbl daily in September. During the first 10 months of this year, production has averaged 227,000 bbl. daily against 216,000 bbl. for the same period a year ago.

Illinois, West Virginia and Texas increased their production in October by the most substantial margins and were chiefly responsible for the higher national total of 7,256,000 bbl. for the month.

Despite the increased rate of production, stocks declined to 227,808,000 gal., compared to 254,352,000 gal. at the end of September.

PRODUCTION
(Thousands of gallons)

	Oct. 1942	Sept. 1942	Jan.Oct. 1942	Jan-Oct. 1941
W. New York	2	1	12	12
W. Pa.	1,292	1,000	12,376	12,552
W. Virginia	8,531	7,150	79,395	77,940
Ohio	513	439	5,336	6,718
Illinois	13,417	11,853	113,897	73,773
Kentucky	3,216	2,812	22,311	28,029
Michigan	149	159	2,067	4,829
Kansas	6,806	6,483	63,929	69,452
Oklahoma	39,020	38,002	370,297	373,991
Texas:	135,055	132,208	1,312,979	1,264,507
Gulf	33,718	32,351	312,874	212,018
East Texas	28,341	28,165	246,671	247,484
Panhandle	34,505	33,690	345,850	361,846
Other	38,491	38,002	407,584	443,159
Arkansas	3,867	3,729	34,639	28,347
Louisiana:	26,719	25,820	245,579	169,371
Gulf	6,601	6,356	57,089	48,903
Inland	20,118	19,464	188,490	120,468
New Mexico	7,456	7,545	71,996	66,902
Colorado	29	9	219	334
Montana	356	328	3,579	3,265
Wyoming	3,360	2,969	29,742	29,683
California	54,964	53,411	525,237	547,615
Total	304,752	293,916	2,893,590	2,757,300
Daily aver.	9,831	9,797	9,518	9,070
Total†	7,256	6,998	68,895	65,650
Daily aver.	234	233	227	216

†Thousands of barrels.

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Rearrangement of Tank-Car Hauls Reduces Oil Deliveries

WASHINGTON, D. C.—Tank-car shipments of crude oil and its products into the East Coast area averaged 736,099 bbl. daily for the week ending December 12. This is a drop of 30,959 bbl. compared with the previous week when daily shipments totaled 767,058 bbl.

However, despite the over-all drop, daily tank-car shipments into the New England states increased to 811 cars daily. This compares with 805 cars daily during the previous week.

Principal reasons for the over-all drop in tank car shipments during the week, are as follows:

1. Increased pipe-line capacity between Lima, Ohio, and Buffalo, N. Y., was provided, with the result that tank cars formerly loaded at Lima picked up approximately 8,000 bbl daily at Buffalo. As Buffalo is in the East Coast area, these figures did not appear as tank-car loadings outside of the East Coast area. Instead, they are credited to pipe-line deliveries.

2. Extremely cold weather in the Midwest, for this time of the year, was a delaying factor.

Oil refinery officials on the East Coast, in the Midwest and Southwest are instituting plans for still greater efficiency in distribution of products from refineries, with an eye to so rearrange the petroleum-supply situation, in some areas, that more tank cars will be released for East Coast service.

To speed up the turnaround time of tank cars, terminals have now been designated in the six East Coast zones to handle tank-car train load lots. After tank cars have unloaded at these terminals, in the quickest and most efficient manner possible, the crude oil and petroleum products are fanned out to surrounding areas by truck and barge.

Following are the managers of each of the six zones on the East Coast:

Zone 1: M. M. Beckes, Boston, Mass.; Zone 2: H. B. Stone, Philadelphia, Pa.; Zone 3: W. H. St. Clair, Baltimore, Md.; Zone 4: W. B. Roberts, Charlotte, N. C.; Zone 5: C. A. Petersen, Atlanta, Ga., and Zone 6: W. Westenberger, Pittsburgh, Pa.

The Dawn of a New Tomorrow
A new day is born . . . a New Year . . . a tomorrow with the inspiring promise of peace and good will among men. We wish you a Merry Christmas and a Happy New Year.
THE CONTINENTAL SUPPLY COMPANY
DALLAS, TEXAS

CONTINENTAL

SERVING THE OIL AND GAS INDUSTRIES

ENGINEERING *and Operating* SECTION

▼

Lower End Points, Reform More To Reduce Gasoline Yield

By ARCH L. FOSTER

Reduce gasoline yields, PAW says; means less and "easier" cracking, more 2 and 4-cent, less 6-cent products, same operating costs. Octane number must be kept up, tetraethyl lead consumption curtailed. Refiners meet this paradoxical situation by lowering end points, reforming, light cracking, and—taking a stiff loss which probably will force some to the wall.

MEETING the new yield requirements issued by the petroleum administrator is perfectly simple, with various exceptions, refiners say. Some of those exceptions are that the refiner cannot make enough money from products to pay for the crude, its transportation to the refinery and for processing it. He cannot raise the octane number of his total gasoline output, by cracking, to permit raising it to competitive levels with permissible amounts of tetraethyl lead, for his TEL purchases are curtailed. And he cannot produce polymer—codimer—for hydrogenation to isooctane for aviation superfuels without production of butenes, by cracking; cracking increases total gasoline percentage. He may thus be driven to try to do two or three mutually contradictory things at the same time.

The private business of refining petroleum has not the power to raise ceilings or prices at will to make up a deficit. Thus he cannot take advantage of the normal working of the law of supply and demand.

Yet there are those who say that the refiner can live by a proper rejuggling of operating conditions, by subdividing his crude charged to meet the requirements. He has been asked to reduce his gasoline production to 75 per cent of his average yield during the last half of 1941, to produce what generally amounts to 22 per cent or more of heavy fuel oil, and to do what he may with the intermediate fractions. In so doing he converts a goodly proportion of material which has been selling formerly for 6 to 7 cents per gallon to cheaper material selling at from 2 to 4 cents. Unavoidably he must take a licking, unless ceilings are raised to permit prices more in keeping with general economics. Crude prices range generally from a dollar upward, at the well. Under the lower gasoline yield, heavier crudes show certain definite advantages, a complete reversal of form for the refiner. Consequently the high gravity, high-priced crude puts its refiners near or in the danger zone. The price of $1.25 per barrel will be used here, therefore, as a basis for calculations; crude prices below that give the refiner somewhat better chance to realize on his operation, simply that more cracking is permitted with the heavier, lower gasoline-content charge stock.

Cost to the Refiner

Handling costs of crude from field to refinery vary widely, of course; an average figure of 8 cents is adopted for our purposes; any variations from either crude or handling costs change the values given but not the order of the following calculations. The initial investment for crude, therefore, will average about $1.33 per barrel, for these purposes.

The total cost of refined products f.o.b. the refinery is $1.33 plus processing costs. Operating costs and the methods of calculating them vary so widely that no attempt can be made here to give more than the roughest estimate; even that may be seriously misleading. Under normal conditions operating costs for a skimmer-cracker plant, not producing lubricants, have been estimated all the way from 12 cents to 63 cents per barrel of charge. Probably the average will lie somewhere betwen $1.50 and $1.75 per barrel of crude.

To summarize the situation, the refiner *must:*

1. Reduce gasoline output to 75 per cent of 1941 figures; this means reduction from about 52 per cent, average of the Mid-Continent and Southwest (excluding the Gulf Coast) to about 39 per cent. Some refiners making a maximum of about 65 per cent will be reduced to about 49 per cent. Refiners who have been producing 40 per cent gasoline and less will be reduced to a yield little if any higher than the straightrun in the crude in many cases. To do this he *must:*

2. Make and sell more kerosene, the next highest-priced product he can make in quantity;

3. Make more distillate and residual fuel oils—heavy oil, No. 6, for the Army, Navy, Merchant Marine and the railroads, also industrial plants now operating mostly at top capacity;

4. Make standard housebrand octane ratings without too much cracking which increases total gasoline yields.

To accomplish these and other results the refiner *may:*

1. Reduce gasoline yields by lowering end point of straightrun gasoline produced; by reforming any or all portions of straightrun gasoline and/or naphthas; by making all sorts of special naphthas, paint thinners, cleaner's naphtha (Stoddard solvent), tractor fuels and distillates, from heavier ends of gasoline; by running heavier crude and thus reducing the straightrun naphtha made.

2. Increase kerosene percentage by adding to that fraction all the heavy naphtha which may be used and remain within flash point and distillation specifications and adding corresponding amounts of heavier material to balance these specifications ;by drastic chemical treating, in

serious cases, of heavy pressure distillate bottoms by which salable products may be made, albeit not a practice indulged in in normal times:

3. Make all intermediate fractions into No. 1 fuel oil, the highest-priced product below kerosene except diesel fuel, which latter can be produced to the extent of sales demand, the remainder of intermediate cuts going as No. 1 fuel;

4. Make all heavy fuel to specifications as it comes from the stills, so no cut-back blending is required;

5. Polymerize all possible olefins first to codimer, if practicable, and the residue nonselectively to polymer gasoline;

6. Segregate any fraction useful for war products—benzene, toluene or mixtures of aromatics—on which an increased price may be realized. A B-B cut containing large percentages of butane and butenes can be sold in some cases.

To this list might well be added "Get a catalytic cracker or an interest in one, for present and future advantage; also an alkylation unit, isomerization unit, or any combination of these which can be installed and operated."

In general, on the basis of operating plans, refineries may be divided roughly into four classes: larger refineries operating lubricating-oil units and probably some special large-capacity unit for war products, as catalytic crackers, aviation-fuel alkylation units, etc.; skimming-cracking plants making 50 per cent or so of total motor fuel, and a more or less full line of other fuels; skimming-cracking plants which strive for a maximum gasoline output with a minimum of kerosene and fuel oil, usually no or practically no distillate fuel oils; and the plants operating on heavy or special crudes producing considerably less than the average motor-fuel yield, plus a line of specialties, asphalt and road oils, naphthas, solvents, etc.

Motor fuel, straightrun or other gasoline, as outlined in last week's discussion (The Oil and Gas Journal, Dec. 17, p. 12) made in Class 1 plants must be disposed of either in the refinery's commercial outlets, the answer in most all cases, or must be allowed for in the total national output because it is necessary that this product be made to obtain the critical products required.

The majority of southwestern refiners fall into either the second or third classes, a few into the fourth. In the second class a typical operation's yields and realization were given last week (p. 13) showing a total return of $1.8825 per barrel of crude processed. This amount left 1.8825 — 1.33 = 0.5525 or 55.25 cents per barrel, with which to pay operating costs and realize a profit.

In the same issue a summary of return is given for a different lineup of yields of the same products, outstanding in which is 39.4 per cent gasoline, 23 per cent heavy fuel oil and 16.5 per cent kerosene. The total realization from this operation which meets requirements is $1.8173, allowing a margin of 48.73 cents per barrel to cover operating costs and profits. At an operation cost of not exceeding 1 cent per gallon of crude the refiner may possibly break even on this plan; at any additional cost he most assuredly will operate in the red, more especially when running at 60-70 per cent capacity as the majority of refiners are doing now.

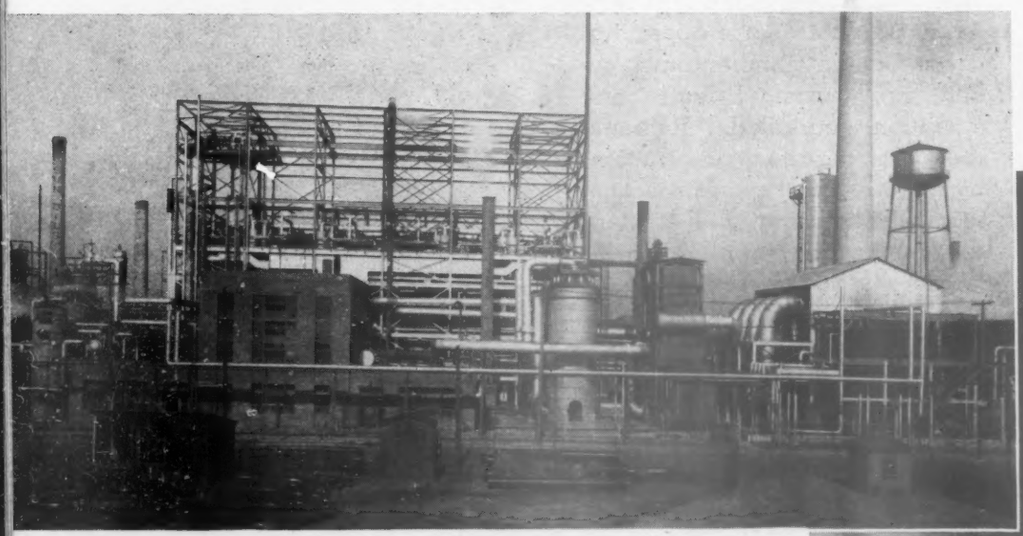
TABLE 1—SUMMARY OF YIELDS AND REALIZATIONS FOR DIFFERENT METHODS OF OPERATION

		1		2		3		4		5	
Product—	Price c/gal.	Yield %	Return	Yield %	Return	Yield %	Return	Yield %	Return	Yield %	Return
Gasoline	6.2	54.0	3.3500	54.0	3.3500	40.0	2.4800	40.0	2.4800	40.0	2.4800
Farm-tractor dist.	5.0	....	.....	....	.....	3.5	0.1750	3.5	0.1750	....	.....
Kerosene-range oil	4.5	....	.....	10.0	0.4500	....	.....	15.0	0.6750	20.0	0.9000
No. 1 fuel	4.05	13.0	0.5265	1.5	0.0608	21.0	0.8505	5.0	0.2025	10.0	0.4050
No. 2 fuel	3.65	3.5	0.1278	5.0	0.1825	5.5	0.2008	6.5	0.2373	1.0	0.0365
Diesel fuel	4.2	....	.....	....	.....	....	.....	....	.....	2.0	0.0840
No. 6 fuel	2.0	22.0	0.4400	22.0	0.4400	22.0	0.4400	22.0	0.4400	9.0	0.1800
Asphalt-road oil	2.60	....	.....	....	.....	....	.....	....	.....	12.0	0.3120
Gas and loss	..	7.5	.....	7.5	.....	8.0	....	8.0	.....	6.0	.....
Total—100 gal.	..	100.0	4.4443	100.0	4.4833	100.0	4.1463	100.0	4.2098	100.0	4.3975
Total— 42 gal.	..	....	1.8660	....	1.8749	....	1.7415	....	1.7681	....	1.8470
Reduction from Oper. 2	..	....	—0.0089	....	.....	....	—0.1234	....	—0.1068	....	—0.0279
Balance above $1.33	..	....	0.5360	....	0.5449	....	0.4115	....	0.4381	....	0.5170

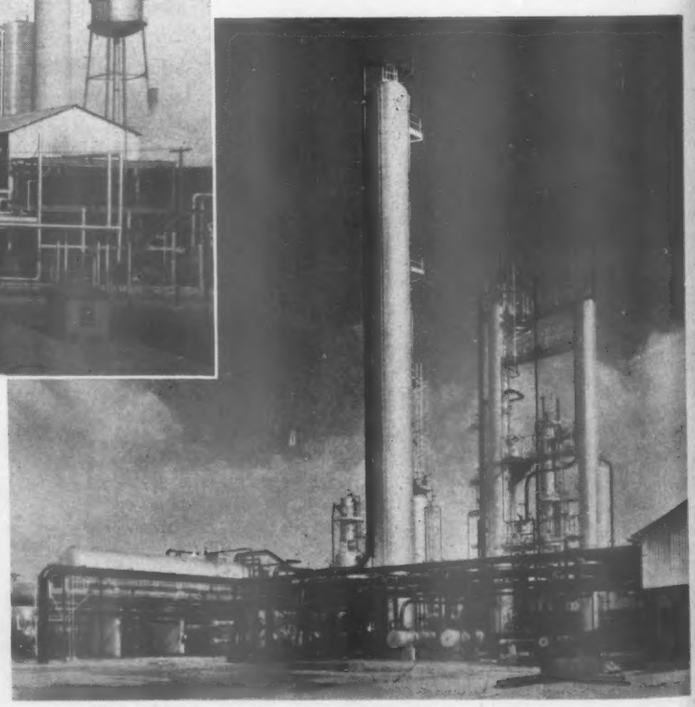
Realization From Operations

In Table 1 are presented prices, yields and gross realization from a typical barrel of crude or mixture of crudes, taken from the estimates and calculations of different refiners operating on the same general types of crude which are similar enough to permit safe comparisons. The prices are averages of two or more values received by different refiners for essentially the same product. Operations 1 and 2 show yields and returns when operating to increase fuel-oil yields, but before reduction of gasoline output to practically 40 per cent of the crude. With high-burning oil yields and no kerosene the return per barrel is $1.8660, Operation 1. Production 10 per cent kerosene at 4.5 cents and only 1.5 per cent of No. 1 burning oil with No. 2 oil raised to 5 per cent under Operation 2 the return is the highest obtained, $1.8749, but only 0.89 cent higher than from Operation 1. The lowest return is with Operation 3, $1.7415, a loss of $0.1334 as compared to Operation 2. This high loss is due, again, to making no kerosene, the highest priced product after gasoline in the list shown. The gross profit on this operation, $0.4115, reduces the margin for paying running expenses and profits to less than 1 cent per gallon, which in many cases may prove to be too small to permit that refiner to survive.

Operation 5 is a particularly attractive one under the conditions. It can be followed only if the refinery has available the vacuum, steam or other



Left: Catalytic cracking units, such as this Houdry installation, are running full blast to supply motor and aviation fuels for the armed forces. Catalytic units will play a controlling part in refinery technology of the future



Right: Catalytic units such as this one are being used to produce alkylate, a major component of aviation superfuels. Many refiners thus can aid in meeting the ever-increasing demand for aviation fuels, who have no other equipment which can be so used

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type of stills which enable it to produce asphalt; the right kind of crude is desirable also, so that this operation cannot be considered a generally applicable one. These refining plants all include a large number of standard products such as are made by the average refiner as common operating practice.

Table 2 illustrates the change in the refiner's

TABLE 2—YIELDS AND REALIZATION FROM REFINERY MAKING HIGH GASOLINE PRODUCTION

Product—	Price c/gal.	Yields— Before 12/1	Yields— After 12/1	Realization— Before 12/1	Realization— After 12/1
Gasoline	6.1	65.0	48.7	3.9650	2.9700
Kerosene	4.7	2.5	12.0	0.1175	0.5640
No. 1 fuel oil	4.2	5.0	11.0	0.2100	0.4620
No. 2 fuel oil	3.7	6.0	...	.....	.....
No. 6 fuel oil	2.0	12.5	23.3	0.2500	0.4660
Loss	..	9.0	5.0	.....	.....
Total—100 gal.	..	100.0	100.0	4.7645	4.4620
Total— 42 gal.	..	...	...	2.0011	1.8740
Balance above $1.33	..	...	...	0.6711	0.5440

picture who has heretofore striven for a maximum production of motor fuels with the necessary minima of other and cheaper products. Formerly making a total of 65 per cent gasoline, with small amounts of kerosene, burning oils and heavy bunker fuel this refiner earlier could realize $2.0011 gross return from each barrel processed, albeit with larger product losses and appreciably higher operating costs. If practicable to convert more of the burning oil to kerosene, a large return can be realized, 17 per cent of kerosene returning about 1 cent more per barrel if burning oil is reduced to 6 per cent. By this operation the refiner loses about 13 cents from his earlier return, about equal to the highest loss shown in Table 1. This is a serious loss and may necessitate a complete revamping of the refiner's plans, a plant shutdown or getting into production of aviation fuel or its components, or other "pegged price" war products.

How Yield Reductions May Be Made

The first thought in gasoline-yield reduction is to lower the end point. If the refiner has been making 50 per cent or more total gasoline, the end point is lowered to 350° F. or even to 325° F. from the earlier 400 end point, and on a crude yielding 30 per cent straightrun this yield may be cut to 20-25 per cent, depending on the composition of the fraction. This light gasoline will show a higher octane number, the lower octane rating material being in the heavier ends. A gasoline of such low end point is not entirely practicable for sale as motor fuel, especially when, as is usually the case, it must be blended with natural or recovery gasoline. Therefore, a heavier fraction of an octane rating higher than that boiling range in straightrun gasolines usually shows must be added to make a balanced fuel. This necessitates cracking.

The effort in cracking will be to maintain octane ratings at such levels that a reasonable amount of lead will suffice to bring the fuel up to housebrand antiknock standards with as little gasoline volume increase as possible. Two relatively simple answers to this problem are handy, provided the refiner has a polymerization unit, and a cracking unit or coil which is or may be used for reforming. These two steps offer the simplest means for reducing the amount of cracking required under a reduced gasoline production scheme. Polymerization of olefinic gases is predicated on cracking or reforming; maintenance of gasoline antiknock quality standards require cracking in nearly all cases, while the new regulations require reduction in total output.

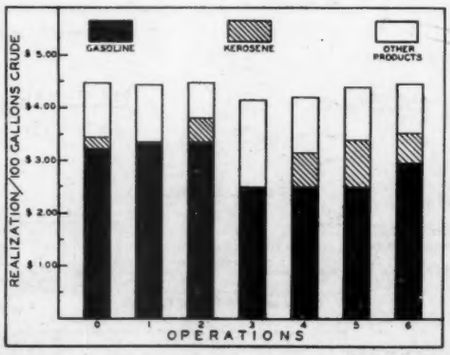
This situation is a contradiction. The refiner may solve it in part by combining the heavy gasoline fraction above the end point of his light gasoline cut, with the light kerosene ends up to, say, 475° F. end point, and reform the whole, reducing the total amount of gasoline which would otherwise be made, at the same time raising the octane number to 68-70 or even higher, to improve the average rating of the blend with the straightrun light cut. Olefins are formed at the same time, may be polymerized to 75-80 octane number and so further improve the antiknock of motor fuel with relatively little volume increase.

Some Cracking Necessary

If the refiner is producing codimer for aviation-fuel manufacture the provision of olefins is a "must." Therefore cracking in some form is also unavoidable; reforming is the answer to both problems. Particularly if an adequate volume of gases is available to warrant an auxiliary polymerizing unit, the tail gases from the codimer operation may be reprocessed at higher temperatures and pressures to yield 1 or 2 per cent of nonselective polymer extremely useful to the refiner's blending operations. Data on selective polymerizing conditions for codimer preparation as used at present are not divulged publicly, but an increase of 50 to 100 per cent in gage pressure and 50° to 100° F. temperature over those used in codimer making will produce this additional nonselective polymer efficiently, we are informed.

In cracking heavy oils to reduced yields, it is not practicable to do this merely by pumping less charge through the unit. In units designed for a given throughput, reduction of total charge increases the time of cracking, increases percentage yields of gasoline; coking is heavier, shutdown time is greater, and operating costs mount rapidly. Correspondingly, increasing total throughput—that is, either fresh charge or recycle—reduces the crack per pass and the total yield on fresh charge; lowered temperature aids the same result, as does pressure reduction. The refiner may reduce temperatures, say, to 915-20° from 925-30°, for example; pressure from 400 lb. to 350 lb., or from 900 lb. to 750 lb., increase throughput from 5,000 bbl. per day to 8,000 bbl., preferably additional fresh charge if practicable, recycle if necessary, or by any combination of changes and degree of changes, and thereby reduce the cracked gasoline to a value permissible when combined with his other motor-fuel components.

Viscosity breaking inevitably produces a certain amount of gasoline, 8-10 per cent or more on the charge. It is also generally necessary to break the viscosity of heavy fuel destined for Bunker C sale, now the insatiable consumer of heavy fuel. In some cases it may be satisfactory and



Realization from operations shown in Tables 1 and 2 (1 to 6) compared with prewar return (O)

give adequate cracked-gasoline yield to charge the entire reduced crude, after removal of such burning oils, kerosene, etc., as may be wanted for those purposes, to a type of controlled viscosity-breaking operation; flashing the whole to drop out heavy fuel and fractionating with one or more sidestreams to take off intermediate oils is a type of operation which may be practicable for some refiners, especially when processing heavier crudes.

When revising outputs of intermediate products the situation is complicated frequently by state specifications, especially for kerosene, naphthas and tractor fuels. In Table 1, Operation 2, the 10 per cent kerosene is the maximum obtainable from that combination of crudes with 76 per cent gasoline plus fuel-oil production, the kerosene meeting the 125° F. flash point, 510° F. end point, 25 plus color specification. In Operation 1 the No. 2 fuel is the balance remaining after that required for cutting fuel oil is used. The No. 1 fuel oil made in Operations 1 and 3—13 and 21 per cent, respectively—shows the largest practicable yield of 125° F. flash point, 565° F. end point burning oil which can be made under those conditions from the crudes charged, while making the other products shown. Correspondingly the 1.5 and 5 per cent of No. 1 fuel in Operations 2 and 4 are the minimum yields of this product practicable when the 10 per cent distillation point is held below 410° F., with a 565° end point.

Heavy Crude Helps Program

Processing a heavier crude may frequently solve the entire refining problem of less gasoline and more fuel oil with still a profit, especially if a fair differential in crude prices is the case. Processing a 30° A.P.I. crude yielding 10-12 per cent straightrun gasoline and costing 20 cents a barrel less at the refinery, the distillate cracker charge stocks—heavy naphtha, gas oil—may be cracked to yield the remainder of 25-30 per cent gasoline; from cracking as much as 50 per cent of such heavy crude distillates, plus viscosity-breaking operations on the heavy residual, nonselective polymerization of the large amount of olefins produced will yield 2 to 4 per cent of the gasoline production. However, if the refiner has been processing too large a percentage of such a heavy crude on which his earlier yields of gasoline have been established, his present permissible yield may be well below the approximately 40 per cent average for the Southwest. In this case the heavy residual may be converted to asphalt, if demand permits; a 10-12 per cent asphalt yield will gross a return advantage, under prices given in Table 1, $0.0302 per crude barrel, with an equal fuel-oil yield, as against a 24 per cent fuel-oil yield alone, provided the asphalt can be sold. In either case the refiner has a net 20-cent price advantage on the crude to help make a payoff. Unfortunately under present conditions there is not enough heavy crude to go around, and the basis of regulated prices must be built on the situation of the majority of refiners who must process crudes containing much more than 10-15 per cent straightrun gasoline.

No attempt is made here to evaluate the return advantages derived from operation of a catalytic-cracking unit, from selective polymerization to make codimer, or for the manufacture of butadiene, butenes; aromatics, or other specific war products. Secrecy prevents any such attempt, for one reason; lack of certain, standardized cost estimates likewise make such evaluations undependable and an unknown quantity. Whether or not a refiner can make a living return from present operations with reduced "money crop" yields will depend on extent of market demands for other products and on the flexibility and efficiency of plant and its operation.

Design of Batching Scraper For Crude-Oil Pipe Lines

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THE arc-welding process is extensively used by pipe-line companies for constructing and maintaining pipe lines and fabricating manifold piping systems. Interest in the larger projects often diverts attention from the benefits to be derived from the use of arc welding in the production of specialized tools and equipment, which may effect better economies in other phases of the companies' operations. It is hoped that the experience related in this paper will focus greater attention to the possibilities of this application of arc welding.

In the early development of overland pipe-line systems for transporting crude oil, oil from various producing areas was mixed together in the main trunk-line system and delivered to the refineries in conglomerate streams. Present refinery practices make it desirable to preserve the identity of crude from certain producing areas, which may differ greatly in specific gravity and physical composition from crudes in neighboring areas, and require separate deliveries to the refinery. Delivery of two or more separate and distinct grades of crude through a single-line pipe-line system is accomplished by "batching"; that is, the batches of different grades, which may be 10,000 or several hundred thousand barrels in volume, are pumped through the pipe line in successive rotation, one immediately behind the other.

These batching operations, through pipe-line systems usually several hundred miles long, present many problems, one being to prevent mixture or intermingling of the crudes at the interface of the opposing columns as they travel through the pipe line; in other words, to prevent a mixture between the heads and tails of the batches. In the absence of a better method of preventing this contamination the usual practice has been to insert between batches a mechanical device known as a "pipe-line scraper" or "go-devil" which was originally designed for removing paraffin deposits from the internal surfaces of pipe lines and has been in general use for this cleaning service throughout the industry for over 20 years.

The use of ordinary pipe-line scrapers has proved unsatisfactory for batching operations due to inefficiency and high maintenance costs. It became evident that a special separating device should be used and, as none was available on the market, one major pipe-line company solved this problem by providing a specially designed plug or scraper. This special device (Fig 1), which will be called a "batching scraper" due to its similarity to the conventional type, subsequently proved to be very successful. Before continuing with a report on its construction it will be necessary first to discuss briefly the mechanical principles involved in the operation of scrapers so that a better comparison may be made of the mechanical features, initial and maintenance costs, and advantages in batching operations of the new batching scrapers with respect to the old-type scrapers previously used.

*This article was submitted to the James F. Lincoln Arc Welding Foundation in its recent $200,000 Industrial Progress Award Program for reports and advances and improvements made by the applications of arc welding in design, fabrication, construction, and maintenance.

The 2½-year study, in which 408 awards were made, indicated a possible annual cost savings of $1,825,000,000 including 7,000,000 tons of steel valued at $271,000,000 and 153,000,000 man hours of labor.

Operation of Scraper

The old-type scraper is propelled through the pipe line by the force of the oil stream acting against circular disks. Friction between the moving scraper and the pipe wall resists the force of the stream, consequently a hydraulic pressure drop is set up from the rear to the front of the scraper which tends to produce a flow of oil around it. This continual bypassing of fluid results in the scraper traveling at a slightly slower rate of speed than the stream, and in traveling a distance of many miles it is evident that a considerable volume of oil from the batch of crude in the rear may be permitted to flow around the scraper and mingle with the dissimilar batch of crude ahead. It follows that in designing a special scraper for batching operations every effort must be made to reduce friction, thereby reducing the pressure drop across the scraper, also to maintain an effective seal between the propelling disks and the pipe wall so that a minimum amount of oil will flow by the scraper.

This company installed flat rubber propelling disks on all of its factory-made scrapers about 5 years ago through the use of shop-made adaptor parts; and later, in cooperation with a leading rubber company, developed the cup-shaped synthetic-rubber disk shown in Fig. 2 which was subsequently patented. These alterations improved the scrapers for both cleaning and batching operations; however, entirely satisfactory results were not obtained and high maintenance costs persisted.

It may be observed that a pipe-line scraper is composed of over 100 separate parts constructed of small bronze castings and machined-steel shapes. Knives scrape the inside pipe wall to remove paraffin deposits. The guide wheels attached to the ends of guide arms rotate against the pipe wall and serve to support the scraper. In traveling distances of many miles these parts are subjected to an enormous amount of wear and our experience has been that the complete assembly of knives and wheels must be replaced after each run of 40 miles, at a cost of about $10 for parts alone. In addition to replacements, due to normal wear, these projecting parts frequently catch on the seat rings of gate valves, pipe couplings and other obstructions in the line and are broken. When such failures occur the entire scraper is likely to lodge in the line and be demolished by the force of the oil stream. A complete new size 8-in. scraper may be purchased for about $70, list price.

Since the company maintains a well equipped and efficiently organized welding shop, combined with a modern machine shop, it was decided to develop a design which would utilize the economy and facility of the arc welding process and could be constructed of scrap materials available from

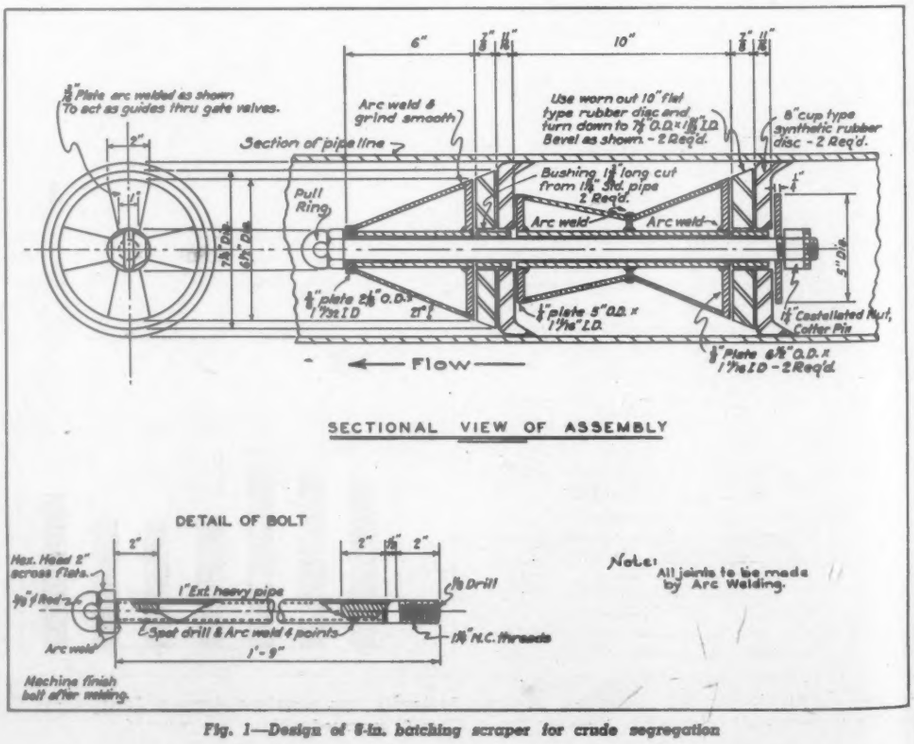
6"
10"
Arc weld & grind smooth
Use worn out 10" flat type rubber disc and turn down to 7⅞ O.D. x 1⅞ I.D. Bevel as shown - 2 Req'd.
8" cup type synthetic rubber disc - 2 Req'd.
Section of pipe line
Pull Ring
Bushing, 1½" long cut from 1¼" Std. pipe 2 Req'd.
Arc weld
Arc weld
¼" plate 2½" O.D. x 1 7/32 I.D.
¼" plate 5" O.D. x 1 7/16" I.D.
½" Castellated Nut, Cotter Pin
⅜" Plate 6⅝" O.D. x 1 7/32 I.D - 2 Req'd.
Flow
SECTIONAL VIEW OF ASSEMBLY
DETAIL OF BOLT
Hex. Head 2" across Flats.
1" Ext heavy pipe
Drill
Spot drill & Arc weld 4 points
1⅛" N.C. threads
Arc weld
1'-9"
Machine finish bolt after welding.
Note: All joints to be made by Arc Welding.

Fig. 1—Design of 8-in. batching scraper for crude segregation

other fabricating work conducted in these shops. The use of steel castings was briefly considered but was discarded as impracticable due to limited application, excessive weight and the prohibitive cost of special patterns, also in view of the fact that it would have been necessary to obtain these castings from an outside concern at a time when such materials are urgently needed in the national war effort.

As a result, the simplified size 8-in. batching scraper, previously referred to and illustrated in Fig. 1, was designed. Guide arms and scraper knives were dispensed with since they serve no useful purpose in batching operations, produce friction, and are expensive to maintain in good repair. The use of cup-shaped synthetic-rubber

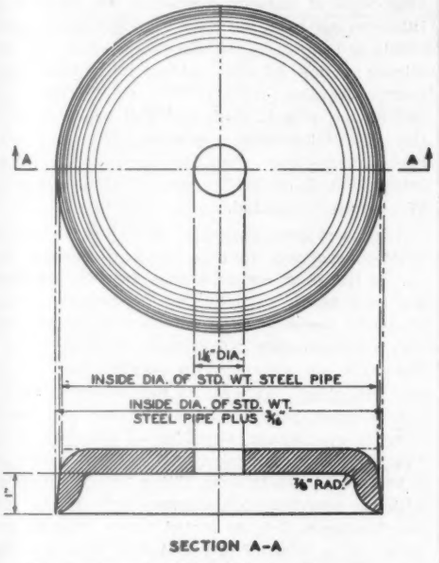

Fig. 2—Cupped rubber disk for line scraper

disks was retained as it was thought they would effect a more positive seal against the pipe wall than any other type of disks available. The principal parts constituting the complete assembly and their purpose are as follows:

(*a*) Two size 8-in. cupped synthetic-rubber disks, the purpose of which has already been mentioned.

(*b*) Two flat-type synthetic-rubber disks which provide additional support for the flexible cupped disks. These are obtained by salvaging worn-out disks from the next larger size scraper and turning on a lathe to the dimensions given.

(*c*) A front body which consists primarily of a circular steel plate for supporting the rubber disks and a conical-shaped framework for guiding the scraper through gate valves in which the steel disks might lodge.

(*d*) A central body of the proper length to place the rubber disks a distance apart sufficient to span the annular space between the seat rings of gate valves and side openings in the pipe lines where branch lines are connected. It should be observed here that if both disks were placed within the limits of such openings the scraper would lodge as the oil stream would be permitted to flow around it.

(*e*) A long bolt through the center for assembling the component parts and to permit the replacement of the rubber disks which incidentally are the only parts subject to wear.

(*f*) Two steel bushings, cut from 1¼-in. pipe, slightly shorter in length than the thickness of each pair of rubber disks. These bushings materially increase the resistance of the body to bending stresses by providing metal to metal contact throughout the entire length of the scraper after the bolt is tightened sufficiently to compress the rubber disks.

Three size 8-in. batching scrapers were built in the company's combination welding and machine shop during the month of April 1942. The unit construction costs are reproduced below:

Material			
2	new 8" cup-type rubber disks at $4.80 each	$9.60	
2	salvaged 10" flat rubber disks at $1.50 each	3.00	
0.5	sq. ft. ⅜" second-hand tank steel	.25	
0.4	sq. ft. ¼" second-hand tank steel	.10	
1.0	sq. ft. ⅛" second-hand tank steel	.30	
1.6'	1¼" std. BM pipe	.18	
1.6'	1" extra heavy seamless pipe	.36	
1	1¼ by 6½" machine bolt with nut	33	
2	lb. Fleetweld No. 5 electrodes	.15	
	Total material	$14.27	$14.27
Labor			
	Cutting—1 hr. at $1.07	$1.07	
	Alignment and welding—2 hr. at $1.28	2.56	
	Machine work—1 hr. at $1.28	1.28	
	Assembly—½ hr. at $1.07	.54	
	Shop overhead	2.00	
	Total labor	$7.45	7.45
	Total cost for each scraper		$21.72

As mentioned before the initial cost of an 8-in. scraper of the type previously used is approximately $70. Subtracting from this the cost of constructing the new scrapers, at $21.72 each, the unit saving is found to be $48.28. Quantity production of 12 to 15 units at a time probably would reduce the labor and overhead costs to about $5 each. Further development may increase the material costs. One improvement being considered is the use of the more expensive high tensile steels which would permit a reduction in weight by decreasing the thickness of the tubing and plates; however this must be postponed until the current shortage of special steels is abated.

Attention is called here to the fact that this is an example of the economies reflected by changing a complicated design composed of cast and machine-made parts to a much simplified design made possible by the development of the arc-welding process. It is not a cost comparison of different methods of producing an identical design.

These batching scrapers were first used in a batching operation through an 8-in. single-line system briefly diagrammed in Fig. 3.

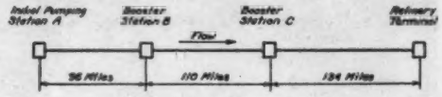

Fig. 3—Plat of line on which test was made

As a means of checking the degree of contamination between batches of crude the procedure has been to take A.P.I. gravity readings of samples drawn from the oil stream at Booster Station C at 30-minute intervals during the period when the batching scraper is expected to arrive at this point. Charts are reproduced below of hourly average gravity readings taken at the tail ends of two batches of the same type of crude which passed Station C on April 9, 1942, and May 2, respectively. In the first operation an old-type scraper was used with cup-shaped rubber disks installed. In the second operation the new batching scraper was used.

An inspection of these charts reveals conclusive proof of the superior efficiency of the new batching scraper. In the first case, Fig. 4, at the time the old-type scraper had arrived at Station C it had lagged behind the interface of the opposing columns of oil which resulted in the contamination of approximately 400 bbl. at the tail end of the batch. In the second case, Fig. 5, the new batching scraper arrived at Station C at approximately the same time as the interface of the columns and a clear separation between the crudes was maintained.

Three of the new scrapers were used in carrying out this batching program from Station A to the refinery terminal, approximately 340 miles apart. At the completion of the operation all three were in good condition except for normal wearing of the rubber disks which would have occurred on any type of scraper used. Although a record was not kept of the repair parts required for the old-type scrapers in the previous batching operation, it is estimated from past experience that at least eight sets of knives and guide wheels would have been worn out and replaced at a cost of $80. Other repair parts and labor probably would have increased this expense to at least $150, all of which was avoided by the use of the new batching scrapers.

The first trial of the new batching scraper also revealed its advantage for use in cleaning the internal surfaces of pipe lines, a result which was not anticipated. A considerable amount of sand and mill scale was received from the line immediately in front of the scraper at Station B,

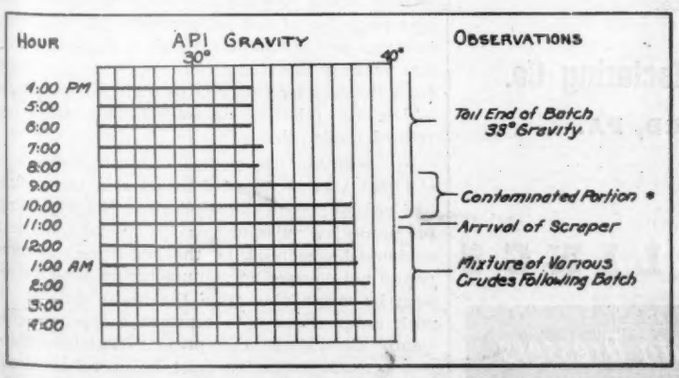

Fig. 4—Observation of oil run with old-type scraper showing mixing of batches

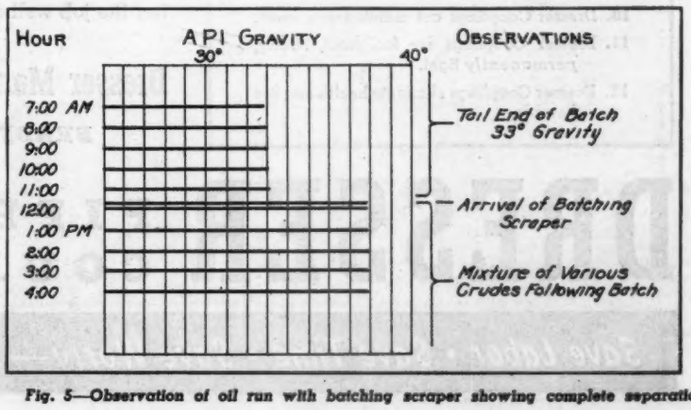

Fig. 5—Observation of oil run with batching scraper showing complete separation

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sufficient in volume to foul the pumps and necessitating the repair of the pump valves. This portion of the company's pipe-line system was constructed in 1939 and since that time conventional scrapers had been run numerous times for the purpose of cleaning the lines. At no previous time had amounts of sediment greater than a few gallons been removed. Scrapers were run only 3 months prior to the batching operations discussed. One would expect that all foreign objects, such as mill scale, left in the line at the completion of its construction would have been removed during the first year of operation. The fact that the new scrapers thoroughly cleaned the line of sediment passed over by the old-type scrapers shows their superiority for this service.

Due to the satisfactory results of this experiment, the company proposes to construct additional batching scrapers, of sizes suitable for pipe lines of various diameters, to be used in future crude batching operations. If later experiments substantiate the above evidence that the wiping action of the rubber cups thoroughly cleans the line without the use of expensive knives and wheels, their use will be extended to this essential service as a means of reducing the high maintenance costs involved in periodical, internal cleaning of the several thousand miles of pipe line operated.

A conservative estimate of the gross annual savings, accruing to this company through the use of batching scrapers, may best be based on the total number of old-type scrapers in service. A recent survey of the entire system revealed that approximately 200 scrapers varying in sizes from 3-in. to 14-in. are in service, the average size being 8-in. At least 25 new scrapers are required each year for replacements and extensions of operations. Considering the cost of the 8-in. size as a fair average, a direct saving of $1,207 would result from filling this requirement with the new batching scrapers built in the company's shop which, as stated above, may be produced at a cost of $48.28 below the purchase price of scrapers of the old type.

It is estimated that the total annual cost of repair parts for the old-type scrapers, not including rubber disks, is in excess of $5,000. A policy of discontinuing the purchase of scrapers, if adopted, would eventually result in the exclusive use of batching scrapers, in which case the $5,000 yearly operating expense would be eliminated.

Sources of information available to the author regarding the extent and economies of batching operations conducted by this company are inadequate to evaluate in dollars the annual benefits to be derived from the use of the new batching scrapers in these operations only. However, it may be said that the purpose of batching different grades of crude is becoming more prevalent with this company as well as others engaged in the transportation of crude oil and its success is dependent upon a practical and efficient mechanical device, such as the one described above, for maintaining a clean-cut segregation between batches. A device of this kind is more urgently needed among pipe-line companies engaged in the transportation of refined products where it may be necessary to handle through a single-line system as many as seven different products, ranging from the heavier fuel oils to high-test gasolines, which are relatively more valuable than unrefined crude oil.

In conclusion, the facility with which this special tool was produced demonstrates the unlimited possibilities in the application of arc welding for producing substitutions for special tools and equipment, essential to the operation of companies not engaged in manufacturing, which may soon be unavailable from the usual sources. If such companies are to continue to operate efficiently throughout the present national emergency much ingenuity must be exercised along these channels.

Methods of Preparing Butadiene

This series of articles presents a complete summary of the sources of butadiene as revealed by the technical literature and by the research staff of Universal Oil Products Co. It contains a total of 38 tables of data. A list of the subjects covered was published on Page 41 of the November 5 issue of the Journal.

By GUSTAV EGLOFF and GEORGE HULLA
Universal Oil Products Co., Chicago, Ill.

PART 8

Table 34 has data on dihaloalkanes and tetrahaloalkanes. The dehydrodebromination (removal of HBr) of 2,3-dibromobutane and the corresponding dehydrodechlorinations of 1,2-, 1,3-, 1,4-, and 2,3-dichlorobutanes have yielded 2.75, 10.6, 12.6, 11, and 34 per cent by weight, respectively, of butadiene-1,3. The theoretical yields of butadiene from dibromobutanes, 25 per cent by weight, are considerably less than those from dichlorobutanes, 42.6 weight per cent. The "efficiency" of soda-lime can be questioned, since 26.4 and 34 per cent weight per cent yields of butadiene have been obtained from mixtures of dichlorobutanes in the presence of vapors of 20 per cent hydrochloric acid as diluent.

Debromination of 1,2,3,4-tetrabromobutane and dichlorination of 1,2,3,4-tetrachlorobutane, both by the action of zinc upon the hot ethanolic solutions, theoretically should yield 14.5 and 27.5 weight per cent of butadiene-1,3, respectively. Thiele secured 11.6-13 per cent yields from the tetrabromobutane.

TABLE 34—CONVERSIONS OF DIHALOALKANES AND TETRAHALOALKANES

Process and polyhaloalkane used	Apparatus and special reactants	Temp. (°C.)	Pressure (atm.)	Remarks (B is butadiene-1,3)	References
Dehydrodebromination of 2,3-dibromobutane $H_3C.CHBr.CHBr.CH_3+2NaOH \rightarrow C_4H_6+2NaBr+2H_2O$ $H_3C.CHBr.CHBr.CH_3+CaO \rightarrow C_4H_6+CaBr_2+H_2O$	Soda-lime was a reactant	Heated		B yield was 2.75% by weight on the dibromobutane	C. Harries, Ann. 383, 157-227 (1911)
Dehydrodechlorination of 1,2-dichlorobutane $ClH_2C.CHCl.CH_2.CH_3+2NaOH \rightarrow C_4H_6+2NaCl+2H_2O$ $ClH_2C.CHCl.CH_2.CH_3+CaO \rightarrow C_4H_6+CaCl_2+H_2O$	Iron tube containing soda-lime	700-730	1	B yield was 10.6% by weight on the dichlorobutane	I. E. Muskat and H. E. Northrup, J. Am. Chem. Soc. 52, 4043-4055 (1930)
Dehydrodechlorination of 1,2-dichlorobutane $ClH_2C.CHCl.CH_2.CH_3+2NaOH \rightarrow C_4H_6+2NaCl+2H_2O$ $ClH_2C.CHCl.CH_2.CH_3+CaO \rightarrow C_4H_6+CaCl_2+H_2O$	Soda-lime was a reactant	470?	1?	B yield = ?	W. H. Perkin, Jr., J. Soc. Chem. Ind. 31, 616-624 (1912)
Dehydrodechlorination of 1,3-dichlorobutane $ClH_2C.CH_2.CHCl.CH_3+2NaOH \rightarrow C_4H_6+2NaCl+2H_2O$ $ClH_2C.CH_2.CHCl.CH_3+CaO \rightarrow C_4H_6+CaCl_2+H_2O$	Soda-lime was a reactant	470?	1?	B yield = ?	Ibid.
Dehydrodechlorination of 1,3-dichlorobutane $ClH_2C.CH_2.CHCl.CH_3+2NaOH \rightarrow C_4H_6+2NaCl+2H_2O$ $ClH_2C.CH_2.CHCl.CH_3+CaO \rightarrow C_4H_6+CaCl_2+H_2O$	Iron tube containing soda-lime	700-730	1	B yield was 12.6% by weight on the dichlorobutane	I. E. Muskat and H. E. Northrup, J. Am. Chem. Soc. 52, 4043-4055 (1930)
Dehydrodechlorination of 1,4-dichlorobutane $ClH_2C.CH_2.CH_2.CH_2Cl+2NaOH \rightarrow C_4H_6+2NaCl+2H_2O$ $ClH_2C.CH_2.CH_2.CH_2Cl+CaO \rightarrow C_4H_6+CaCl_2+H_2O$	Soda-lime was a reactant	470?	1?	B yield = ?	W. H. Perkin, Jr., J. Soc. Chem. Ind. 31, 616-624 (1912)
Dehydrodechlorination of 1,4-dichlorobutane $ClH_2C.CH_2.CH_2.CH_2Cl+2NaOH \rightarrow C_4H_6+2NaCl+2H_2O$ $ClH_2C.CH_2.CH_2.CH_2Cl+CaO \rightarrow C_4H_6+CaCl_2+H_2O$	Iron tube containing soda-lime	700-730	1	B yield was 11.0% by weight on the dichlorobutane	I. I. Muskat and H. E. Northrup, J. Am. Chem. Soc. 52, 4043-4055 (1930)
Dehydrodechlorination of 2,3-dichlorobutane $H_3C.CHCl.CHCl.CH_3 \rightarrow C_4H_6+2HCl$	Steam was used with feed	600-700	1	B yield = ?	F. E. Matthews, H. J. W. Bliss, and H. M. Elder, British Patent 17,234 of July 24, 1913
Dehydrodechlorination of 2,3-dichlorobutane $H_3C.CHCl.CHCl.CH_3 \rightarrow C_4H_6+2HCl$	Silicon carbide rod heated electrically	Bright red heat		B yield was 34% by weight on feed	H. Baehr and W. Deiters (assignors to Jasco, Inc.), U. S. Patent 2,259,195 of Oct. 14, 1941 [This patent is now vested in L. T. Crowley, Alien Property Custodian; Federal Register 7, No. 62, 2417-2424 (1942)]; I. G. Farbenindustrie A.-G., French Patent 837,411 of Feb. 9, 1939
Dehydrodechlorination of 1,2- and 2,3-dichlorobutanes mixture $ClH_2C.CHCl.CH_2.CH_3 \rightarrow C_4H_6+2HCl$ $H_3C.CHCl.CHCl.CH_3 \rightarrow C_4H_6+2HCl$	Acid-proof cast-iron pipe. Vapors of 20% hydrochloric acid were used as diluent for the feed.	700	1	B yield was 26.4% by weight on mixed dichlorobutanes	M. Mueller-Cunradi, A. Cantzler, and H. Krekeler (assigners to Jasco, Inc.), U. S. Patent 2,276,023 of March 10, 1942
Dehydrodechlorination of "dichlorobutanes" $C_4H_8Cl_2 \rightarrow C_4H_6+2HCl$	Tube of acid-proof material filled with silicic acid gel. Vapors of 20% hydrochloric acid were used as diluent for the feed	650	1	B yield was 34.0% by weight on "dichlorobutanes." The feed dichlorobutanes can be prepared by chlorination of *n*-butane, *n*-butenes, or 1-chlorobutane	Ibid.
Dibromination of 1,2,3,4-tetrabromobutane $BrH_2C.CHBr.CHBr.CH_2Br+2Zn \rightarrow C_4H_6+2ZnBr_2$	Zn + Cu couple and ethanol were used as reactants	Warmed	1	B yield = ?	H. E. Armstrong and A. K. Miller, J. Chem. Soc. 1886, 74-93
Dibromination of 1,2,3,4-tetrabromobutane $BrH_2C.CHBr.CHBr.CH_2Br+2Zn \rightarrow C_4H_6+2ZnBr_2$	Zn and ethanol were used as reactants	Boiling point of solution	1	B yield was 11.6-13.0% by weight on feed	J. Thiele, Ann. 308, 333-343 (1899)
Dibromination of 1,2,3,4-tetrabromobutane $BrH_2C.CHBr.CHBr.CH_2Br+2Zn \rightarrow C_4H_6+2ZnBr_2$	Zn and ethanol were used as reactants			B yield = ?	V. N. Ipatieff, J. prakt. Chem. (2) 67, 420-422 (1903)
Dechlorination of 1,2,3,4-tetrachlorobutane (liquid form) $ClH_2C.CHCl.CHCl.CH_2Cl+2Zn \rightarrow C_4H_6+2ZnCl_2$	Zn and ethanol were used as reactants	Boiling point of solution	1	B yield = ?	I. E. Muskat and H. E. Northrup, J. Am. Chem. Soc. 52, 4043-4055 (1930)
Dechlorination of 1,2,3,4-tetrachlorobutane (solid form) $ClH_2C.CHCl.CHCl.CH_2Cl+2Zn \rightarrow C_4H_6+2ZnCl_2$	Zn and ethanol were used as reactants	Boiling point of solution	1	B yield = ?	Ibid.

(Continued on Next Page)

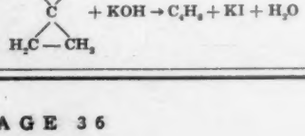
Table 35 gives data on the conversion of haloalkenes and polyhaloalkenes into butadiene-1,3. The couplings of chloroethene, bromoethene, and iodoethene *per se* theoretically should yield 43.3, 25.3, and 17.6 weight per cent of butadiene, respectively. Smaller yields are obtained in practice, e.g., 22.4 per cent by weight on chloroethene. These low results are expected, due to the tendency of the haloalkenes to undergo polymerization, dehydrodehalogenation, or addition. No yield data are available for the other listed conversions, namely, dehydrodehalogenations of 3-bromobutene-1, the 1-bromobutene-2, and 3-chlorobutene-1, dehalogenations of 3,4-dichlorobutene-1, the 1,4-dichlorobutene-2, the 1,4-dibromobutene-2, and 1,4-diiodobutene-2, and the hydrogenation plus debromination of butadiyne hexabromide. It may be remarked that zinc in the presence of boiling ethanol acts mainly as a dehalogenating agent, whereas the same metal when used in conjunction with boiling acetone serves as both a hydrogenating and dehalogenating reactant. The acetone can be looked upon as the source of the required hydrogens.

TABLE 35—CONVERSIONS OF HALOALKENES AND POLYHALOALKENES

Process and derivatives used—	Apparatus and special reactants	Temp. (°C.)	Pressure (atm.)	Remarks (B is butadiene-1,3)	References
Coupling of chloroethene (i.e., vinyl chloride) using copper $2\ H_2C=CHCl + 2\ Cu \rightarrow C_4H_6 + 2\ CuCl$	Cu tube containing finely divided Cu as reactant.	400	?	B yield was 9.4% by weight on chloroethene feed per pass and 22.4% by weight on chloroethene with recycling.	C. J. Leyes, German Patent 569,343 of Dec. 3, 1931; Friedlaender's Fortschritte der Teerfarbenfabrikation 18, 138-140 (1933).
Coupling of chloroethene using various metals $2\ H_2C=CHCl + metal \rightarrow C_4H_6 + metal\ chloride$	Fe, Cu, Pb, Sn, Bi, Sb, and Cd and reactants. Al and Zn are not suitable	100-400	?	B yields = ?	C. J. Leyes, French Patent 672,210 of Dec. 24, 1929; British Patent 329,748 of May 29, 1930.
Coupling of chloroethene using various metals $2\ H_2C=CHCl + metal \rightarrow C_4H_6 + metal\ chloride$	Fe, Cu, Pb, Sn, Bi, Sb, Cd, and Zn are reactants.	100-400	?	B yields = ?	C. J. Leyes, U. S. Patent 1,884,002 of Oct. 25, 1932.
Coupling of bromoethene (i.e., vinyl bromide) using zinc and acetone $2\ H_2C=CHBr + Zn \rightarrow C_4H_6 + ZnBr_2$	Zinc plus acetone were reactants.	150	Above 1	B yield = ?	F. Leibbrandt, German Patent 346,700 of Jan. 3, 1922; Chem. Zentr. 1922, II, 443.
Coupling of bromoethene using tin $2\ H_2C=CHBr + Sn \rightarrow C_4H_6 + SnBr_2$	Tin was a reactant.	400-500	?	B yield = ?	C. J. Leyes, German Patent 569,343 of Dec. 3, 1931; Friedlaender's Fortschritte der Teerfarbenfabrikation 18, 138-140 (1933).
Coupling of bromoethene using magnesium $2\ H_2C=CHBr + Mg \rightarrow C_4H_6 + MgBr_2$	Grignard apparatus, using bromoethene, ether, and Mg followed by 2-chloropropene and by ice + acetic acid.	Room temperature	1	B yield was "small." Main product was 2-methylbutadiene-1,3	G. Austerweil, German Patent 245,180 of March 28, 1912.
Coupling of bromoethene using various metals $2\ H_2C=CHBr + metal \rightarrow C_4H_6 + metal\ bromide$	Fe, Cu, Pb, Sn, Bi, Sb, and Cd are reactants. Molten Sn is preferable. Al and Zn are not suitable.	100-400	?	B yield = ?	C. J. Leyes, French Patent 672,210 of Dec. 24, 1929; British Patent 329,748 of May 29, 1930.
Coupling of bromoethene using various metals $2\ H_2C=CHBr + metal \rightarrow C_4H_6 + metal\ bromide$	Fe, Cu, Pb, Sn, Bi, Sb, Cd, and Zn are reactants. Molten Sn is preferable.	100-400	?	B yields = ?	C. J. Leyes, U. S. Patent 1,884,002 of Oct. 25, 1932.
Coupling of iodoethene (i.e., vinyl iodide) $2\ H_2C=CH.\ I + metal \rightarrow C_4H_6 + metal\ iodide$	Fe, Cu, Pb, Sn, Bi, Sb, and Cd are reactants. Al and Zn are not suitable.	100-400	?	B yields = ?	C. J. Leyes, French Patent 672,210 of Dec. 24, 1929; British Patent 329,748 of May 29, 1930.
Coupling of iodoethene (i.e., vinyl iodide) $2\ H_2C=CH.\ I + metal \rightarrow C_4H_6 + metal\ iodide$	Fe, Cu, Pb, Sn, Bi, Sb, Cd, and Zn are reactants.	100-400	?	B yields = ?	C. J. Leyes, U. S. Patent 1,884,002 of Oct. 25, 1932.
Dehydrodebromination of 3-bromobutene-1 and 1-bromobutene-2 mixture (i.e., "crotyl bromide") $H_2C=CH \cdot CHBr \cdot CH_3 + H \cdot COOK \rightarrow C_4H_6 + KBr + H \cdot COOH$ $BrH_2C \cdot CH=CH \cdot CH_3 + H \cdot COOK \rightarrow C_4H_6 + KBr + H \cdot COOH$	Sealed tube.	160-180	Above 1	B yield = ?	E. Charon, Ann. chim. (7) 17, 192-288 (1899).
Dehydrodechlorination of 3-chlorobutene-1 $2\ H_2C=CH \cdot CHCl \cdot CH_3 + CaO \rightarrow 2\ C_4H_6 + CaCl_2 + H_2O$	CaO was a reactant.	Dull red heat	1?	B yield = ?	F. E. Matthews, E. H. Strange, and H. J. Wheeler, British Patent 12,771 of May 30, 1913.
Dechlorination of 3,4-dichlorobutene-1 $H_2C=CH \cdot CHCl \cdot CH_2Cl + Zn \rightarrow C_4H_6 + ZnCl_2$	Zinc + ethanol were used as reactants.	Heated	1	B yield = ?	I. E. Muskat and H. E. Northrup, J. Am. Chem. Soc. 52, 4,043-4,055 (1930).
Dechlorination of 1,4-dichlorobutene-2 $ClH_2C \cdot CH=CH \cdot CH_2Cl + Zn \rightarrow C_4H_6 + ZnCl_2$	Zinc + ethanol were used as reactants.	Heated	1	B yield = ?	Ibid.
Debromination of 1,4-dibromobutene-2 $BrH_2C \cdot CH=CH \cdot CH_2Br + Zn \rightarrow C_4H_6 + ZnBr_2$	Zinc + ethanol were used as reactants.	Heated	1	B yield = ?	J. Thiele, Ann. 308, 333-343 (1899).
Debromination of 1,4-dibromobutene-2 $BrH_2C \cdot CH=CH \cdot CH_2Br + Zn \rightarrow C_4H_6 + ZnBr_2$	Zinc + ethanol were used as reactants.	Heated			S. V. Lebedev and N. A. Skavronskaya, J. Russ. Phys.-Chem. Soc. 43, 1,124-1,131 (1911).
Deiodination of 1,4-diiodobutene-2 $IH_2C \cdot CH=CH \cdot CH_2I \rightarrow C_4H_6 + I_2$	Alkalies or silver oxide can be used as reactants.	Heated in absence of Ag_2O or alkali		B yield = ?	A. A. Petrov, Trans. Voronezh State Univ. 10, No. 2, 101-183 (1938); Translation S-160 in Feb. 27, 1942 Universal Oil Products Co. Survey of Foreign Petroleum Literature.
Action of zinc plus acetone on butadiyne hexabromide (probably the m.p. 186.5° C. form of 1,2,3,3,4,4-hexabromobutene-1) possibly $BrHC=CBr \cdot CBr_2 \cdot CHBr_2 + Zn + 4\ H_3C \cdot CO \cdot CH_3 \rightarrow C_4H_6 + ZnBr_2 + 4\ BrH_2C \cdot CO \cdot CH_3$	Zinc plus acetone were reactants.	Boiling point of solution	1	B yield = ?	F. Straus and L. Kollek, Ber. 59, 1,664-1,681 (1926).

Table 36 lists several conversions of halocyclanes and dihalocyclanes. The decyclization plus dehydrodehalogenations of iodomethyl cyclopropane and bromocyclobutane are effected by slight heating in the presence of potassium hydroxide and quinoline, respectively. The later reagent also has been used at 238° C. with 1,2-dibromocyclobutane, indicating that it can simultaneously exert a reductive action. Dehydrodechlorination of chlorocyclohexane and subsequent thermal decomposition of the resulting cyclohexane form the basis of a process requiring but one reaction tube. The actual yield is unknown. A similar dehydrodechlorination and decyclization ("depolymerization") of 1-vinylcyclohexene-3 dihydrochloride, but in one step over hot soda-lime, furnishes 40-50 weight per cent of butadiene-1,3. The theoretical yield for the same reaction is 59.7 per cent.

TABLE 36—CONVERSIONS OF HALOCYCLANES AND DIHALOCYCLANES

Process and derivative used—	Apparatus and special reactants	Temp. (°C.)	Pressure (atm.)	Remarks (B is butadiene-1,3)	References
Decyclization and dehydrodeiodination of iodomethyl cyclopropane (i.e., cyclopropyl methyl iodide)  $+ KOH \rightarrow C_4H_6 + KI + H_2O$		Slightly heated			N. Demyanov, J. Russ. Phys-Chem. Soc. 35, 375-381 (1903); Chem. Zentr. 1903, 2, 489.

(Continued on Next Page)

TABLE 36—CONVERSIONS OF HALOCYCLANES AND DIHALOCYLANES (Continued)

Process and derivatives used—	Apparatus and special reactants	Temp. (°C.)	Pressure (atm.)	Remarks (B is butadiene-1,3)	References
Decyclization and dehydrodebromination of bromocyclobutane $H_2C—CHBr$ $\|\ \ \|$ $\rightarrow C_4H_6 + HBr$ $H_2C—CH_2$				See Ostromyslenskii's book for possible details.	I. I. Ostromyslenskii, "Theory of the Benzene Ring and the Ethylene Linkage," Moscow (1909) pp. 194-195; cf. I. I. Ostromyslenskii, J. Russ. Phys.-Chem. Soc. 47, 1,472-1,494 (1915); Translation S-152 in Feb. 6, 1942, Universal Oil Products Co. Survey of Foreign Petroleum Literature.
Decyclization and dehydrodebromination of bromocyclobutane $H_2C—CHBr$ $\|\ \ \|$ $+ C_5H_7N \rightarrow C_4H_6 + C_5H_7N \cdot HBr$ $H_2C—CH_2$	Quinoline was a reactant.	110-120			I. I. Ostromyslenskii, J. Russ. Phys.-Chem. Soc. 47, 1,978-1,982 (1915); Chem. Zentr. 1916, 2, 307.
Dehydrodechlorination of chlorocyclohexane into cyclohexene and subsequent thermal decomposition of the latter $2\ C_6H_{11}Cl + CaO \rightarrow 2\ C_6H_{10} + CaCl_2 + H_2O$ $C_6H_{10} \rightarrow C_4H_6 + C_2H_4$	Quartz tube in which the first half contained lime and in which the second half was empty.	400-600 (First half of tube) Moderate red heat (second half of tube)	1 or less	B yield = ?	Badische Anilin-und Soda-Fabrik, German Patent 252,499 of Oct. 23, 1912, and British Patent 27,387 of Nov. 21, 1912.
Debromination of 1,2-dibromocyclobutane $H_2C—CHBr$ $\|\ \ \|$ $+ C_5H_7N \rightarrow C_4H_6 +$ complex product $H_2C—CHBr$	Quinoline was a reactant.	238	1	B yield = ?	R. Willstatter and W. von Schmaedel, Ber. 38, 1,992-1,999 (1905).
Decyclization and dehydrodechlorination of 1-vinylcyclohexene-3 dihydrochloride [probably 1-chloro-4-(1-chloroethyl)-cyclohexane] $C_6H_{10}Cl_2 + 2NaOH(CaO) \rightarrow 2C_4H_6 + 2NaCl(CaCl_2) + 2(1)H_2O$	Iron pipe containing soda-lime as reactant.	Dark red heat	1	B yield was 40-50% by weight on the dihydrochloride.	A. Gerlach and R. Koetschau, German Patent 268,722 of Sept. 15, 1913; Friedlaender's Fortschritte der Teerfarbenfabrikation 2, 823-825 (1915).

Table 37 is concerned with the slight production (about 0.2 weight per cent) of butadiene-1,3 in coal carbonization under either low temperature (400°-700° C.) or high temperature (700°1,500° C.) conditions. More data are necessary to establish which process gives the most butadiene per ton of a given coal.

TABLE 37—CARBONIZATION OF COAL

Process—	Equipment used	Temp. (°C.)	Pressure (atm.)	Remarks (B is butadiene-1,3)	References
Low-temperature carbonization:					
"Lohberg" coal		321-575		The coal gas had about 2.05% of B in its "unsaturates" fraction.	H. Arnold, Z. angew Chem. 37, 85-87 (1924).
"Dalton Main" coal		400-700		The coal gas had 0.06% of B by volume.	A. B. Manning, J. G. King, and F. S. Sinnatt, Dept. of Sci. and Ind. Research (Great Britain), Technical Report 19, 19 pp. (1928)
Coal	Vertical retort.			The coal gas had 0.15% of B by volume.	Ibid.
Coal	Equipment for fractionation of the light oil secured.			B was present in the light oil fraction boiling at less than 75° C.	F. Schutz, W. Buschmann, and H. Wissebach, Ber. 56B, 869-874 (1923).
High-temperature carbonization:					
"Kinneil" coal	Vertical retort.	1,250		The coal gas had 0.02% of B by volume.	A. B Manning, J G. King, and F. S. Sinnatt, Dept. of Sci. and Ind. Research (Great Britain), Technical Report 19, 19 pp. (1928)
"Kinneil" coal	Horizontal retort.	1,350		The coal gas had 0.01% of B by volume.	Ibid.
Coal	Equipment for fractionation of the benzene forerunnings.			B was present in the forerunnings.	K. Helbing, Ann. 172, 281-297 (1874).

Table 38 is a compilation of some chemical methods for the separation of butadiene-1,3 from its mixtures containing other hydrocarbons or inert gases. Butadiene can be separated from its mixtures containing hydrogen, nitrogen, methane or other alkanes by simply scrubbing with solutions of copper, silver, or mercury salts. The resulting absorbed butadiene is afterwards liberated from its complexes by warming, with or without the aid of a vacuum. It is advisable to remove ethyne before subjection of any gaseous mixture to the main absorption process, since metallic acetylides would be formed simultaneously and might detonate violently upon further treatment. In the case of gaseous mixtures that contain alkenes, such as butenes, solutions of cuprous chloride are employed because the corresponding butadiene complex is obtained as a solid precipitate. The latter is easily separated from the reaction liquor containing similarly decomposable complexes of the alkenes. An inspection of the table indicates that dissociations of the complexes of butadiene-1,3 with cuprous bromide or chloride can be profitably carried out.

TABLE 38—SOME CHEMICAL METHODS OF SEPARATION OF BUTADIENE-1,3 FROM ITS MIXTURES WITH OTHER HYDROCARBONS

Process—	Apparatus and special reactants	Temp. (°C.)	Presure (atm.)	Remarks (B is butadiene-1,3)	References
Dissociation of butadiene cuprous chloride complexes $C_4H_6 \cdot 2CuCl \rightarrow C_4H_6 + Cu_2Cl_2$ $C_4H_6 \cdot 2CuCl \cdot 4H_2O \rightarrow C_4H_6 + Cu_2Cl_2 + 4H_2O$	The solid complex was heated alone.	Heated	1	B yield = ?	I. G. Farbenindustrie A.-G., British Patent 303,323 of Jan. 3, 1929; P. Feller (assignor to I. G. Farbenindustrie A.-G.), U. S. Patent 1,795,549 of Mar. 10, 1931.
Dissociation of butadiene cuprous chloride complexes $C_4H_6 \cdot 2CuCl \rightarrow C_4H_6 + Cu_2Cl_2$ $C_4H_6 \cdot 2CuCl \cdot 4H_2O \rightarrow C_4H_6 + Cu_2Cl_2 + 4H_2O$	The solid complex was theated with hydrochloric acid.	Room	1 or vacuo	B yield = ?	Ibid.

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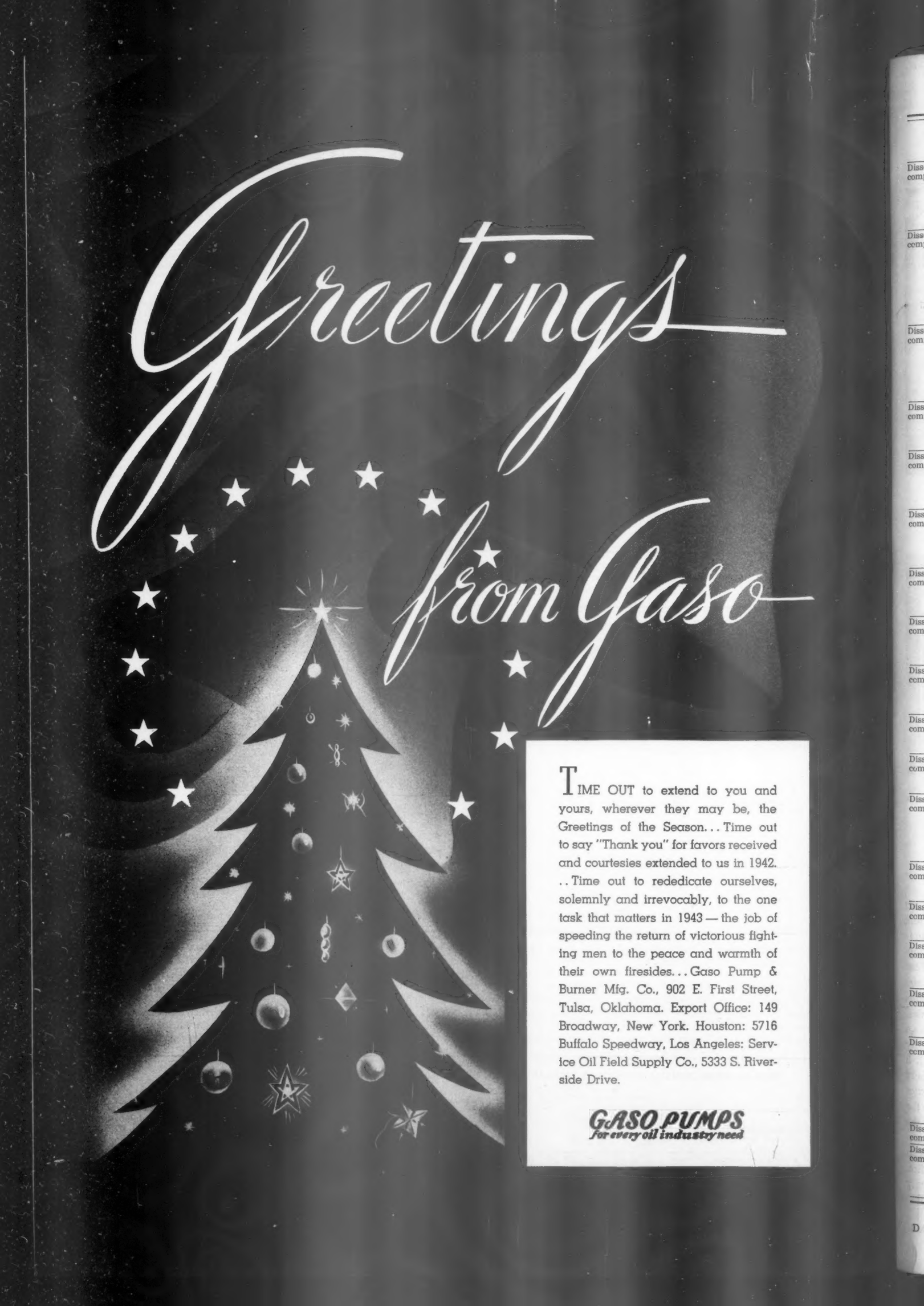

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TABLE 38—SOME CHEMICAL METHODS OF SEPARATION OF BUTADIENE-1,3 FROM ITS MIXTURES WITH OTHER HYDROCARBONS (Continued)

Process—	Apparaus and special reactants	Temp. (°C.)	Pressure (atm.)	Remarks (B is butadiene-1,3)	References
Dissociation of butadiene cuprous chloride complexes $C_4H_6 \cdot 2CuCl \rightarrow C_4H_6 + Cu_2Cl_2$ $C_4H_6 \cdot 2CuCl \cdot 4H_2O \rightarrow C_4H_6 + Cu_2Cl_2 + 4H_2O$	The solid complex was heated alone.	Gently heated	1	B yield was theoretical (i.e., 17-21% by weight on complex, depending on its degree of hydration).	N. V. de Bataafsche Petroleum Maatschappij, British Patent 359,234 of Oct. 22, 1931, and French Patent 705,214 of June 2, 1931; A. J. van Peski (assignor to Shell Development Co.), U. S. Patent 1,999,159 of April 23, 1935.
Dissociation of butadiene cuprous chloride complexes $C_4H_6 \cdot 2CuCl \rightarrow C_4H_6 + Cu_2Cl_2$ $C_4H_6 \cdot 2CuCl \cdot 4H_2O \rightarrow C_4H_6 + Cu_2Cl_2 + 4H_2O$	The solid complex was heated alone.	Heated		See Bull. Exptl. Synthetic Rubber Plant B for data.	A. I. Volzhinskii and Dmitrieva, Bull. Exptl. Synthetic Rubber Plant B, 1933, No. 2, p. 6; cf. I. L. Fridshtein, A. F. Tyul'neva, and M. A. Safonov, Sinteticheskii Kauchuk (Synthetic Rubber), 1935, No. 3, pp. 13-19 (Translation S-207 of Aug. 7, 1942, Universal Oil Products Co. Survey of Foreign Petroleum Literature).
Dissociation of butadiene cuprous chloride complexes $C_4H_6 \cdot 2CuCl \rightarrow C_4H_6 + Cu_2Cl_2$ $C_4H_6 \cdot 2CuCl \cdot 4H_2O \rightarrow C_4H_6 + Cu_2Cl_2 + 4H_2O$	The complex can be prepared from Cu_2Cl_2 alone, on pumice, in pure water, or in presence of solutions of NH_4Cl, NaCl, or $CaCl_2$. The complex can be dissociated by heat, NaCl, NH_4Cl, $CaCl_2$, KBr, $FeCl_2$, Cu_2Cl_2, or pyridine.	95 (Solutions)	1	B yield at 95° was theoretical (i.e., 17-21% by weight on complex, depending on its degree of hydration).	M. A. Lurie, M. N. Marushkin, V. O. Chistov, and M. A. Shlossberg, Sintet. Kauchuk 3, No. 6, 13-18 (1934); Chem. Abs. 32, 6,098-6,099 (1938).
Dissociation of butadiene cuprous chloride complexes $C_4H_6 \cdot 2CuCl \rightarrow C_4H_6 + Cu_2Cl_2$ $C_4H_6 \cdot 2CuCl \cdot 4H_2O \rightarrow C_4H_6 + Cu_2Cl_2 + 4H_2O$	The solid complex was dissociated by heat or moist air or concentrated NH_4Cl solution or alkali chloride solutions.	62.5	1.00	See original article for data.	M. A. Lurie, M. N. Marushkin, M. M. Afanas'ev, and A. I. Pimenov, Sintet. Kauchuk 3, No. 6, 19-29 (1934); Chem. Abs. 32, 6,099 (1938).
Dissociation of butadiene cuprous chloride complexes $C_4H_6 \cdot 2CuCl \rightarrow C_4H_6 + Cu_2Cl_2$ $C_4H_6 \cdot 2CuCl \cdot 4H_2O \rightarrow C_4H_6 + Cu_2Cl_2 + 4H_2O$	The complex was dissociated by ammonium hydroxide, dilute alkali, dilute hydrochloric acid, sulfuric acid, or nitric acid.	0 (Alkalies)		See original article for data.	G. G. Koblyanskii, A. A. Shul'ts, and K. B. Piotrovskii, Trudy Gosud. Opyt. Zavoda Sintet. Kauchuka Litera B, 4. Synthetic Rubber 1935, pp. 20-23; Chem. Abs 31, 7,036 (1937).
Dissociation of butadiene cuprous chloride complexes $C_4H_6 \cdot 2CuCl \rightarrow C_4H_6 + Cu_2Cl_2$ $C_4H_6 \cdot 2CuCl \cdot 4H_2O \rightarrow C_4H_6 + Cu_2Cl_2 + 4H_2O$	Iron cylinders lined with copper. The complex was dissociated by an aqueous solution of cuprous chloride plus ammonium chloride.	30-80 (preferably 80)	1	B yield was theoretical (i.e., 17-21% by weight on complex, depending on its degree of hydration).	I. L. Fridshtein, A. F. Tuyl'neva, and M. K. Safonov, Sinteticheskii Kauchuk (Synthetic Rubber), 1935, No. 3, pp. 13-19; Translation S-207 of Aug. 7, 1942, Universal Oil Products Co. Survey.
Dissociation of butadiene cuprous chloride complexes $C_4H_6 \cdot 2CuCl \rightarrow C_4H_6 + Cu_2Cl_2$ $C_4H_6 \cdot 2CuCl \cdot 4H_2O \rightarrow C_4H_6 + Cu_2Cl_2 + 4H_2O$	Iron cylinders lined with copper. The complex was dissociated by an aqueous solution of cuprous chloride plus sodium chloride.	80 (?)	1	B yield = ?	Ibid.
Dissociation of butadiene cuprous chloride complexes $C_4H_6 \cdot 2CuCl \rightarrow C_4H_6 + Cu_2Cl_2$ $C_4H_6 \cdot 2CuCl \cdot 4H_2O \rightarrow C_4H_6 + Cu_2Cl_2 + 4H_2O$	Hot water or steam jacketed autoclave containing the complex compound and an aqueous solution of cuprous and ammonium chloride.	60	1	B yield = ?	B. T Brooks (assignor to Standard Alcohol Co.), U. S. Patent 1,988,479 of Jan. 22, 1935.
Dissociation of butadiene cuprous chloride complexes $C_4H_6 \cdot 2CuCl \rightarrow C_4H_6 + Cu_2Cl_2$ $C_4H_6 \cdot 2CuCl \cdot 4H_2O \rightarrow C_4H_6 + Cu_2Cl_2 + 4H_2O$	The complex was prepared from a suspension of cuprous chloride and aqueous solution of cuprous chloride plus ammonium chloride.			Actual dissociation of the complex was not described since not integral with the patent.	B. T. Brooks (assignor to Standard Alcohol Co.), U. S. Patent 2,058,851 of Oct. 27, 1936.
Dissociation of butadiene cuprous chloride complexes $C_4H_6 \cdot 2CuCl \rightarrow C_4H_6 + Cu_2Cl_2$ $C_4H_6 \cdot 2CuCl \cdot 4H_2O \rightarrow C_4H_6 + Cu_2Cl_2 + 4H_2O$	The complex was dissociated by an aqeous solution of cuprous chloride, ammonium and stannous chloride.	60	1	B yield = ?	G. M. Hebbard and L. E. Lloyd (assignors to the Dow Chemical Co.), U. S. Patent 2,188,899 of Feb. 6, 1940.
Dissociation of butadiene cuprous chloride complexes $C_4H_6 \cdot 2CuCl \rightarrow C_4H_6 + Cu_2Cl_2$ $C_4H_6 \cdot 2CuCl \cdot 4H_2O \rightarrow C_4H_6 + Cu_2Cl_2 + 4H_2O$	The solid complex was heated.	55-65 (60)	1	B yield = ?	G. M. Hebbard and L. E. Lloyd (assignors to the Dow Chemical Co.), U. S. Patent 2,189,173 of Feb. 6, 1940.
Dissociation of butadiene cuprous chloride complexes $C_4H_6 \cdot 2CuCl \rightarrow C_4H_6 + Cu_2Cl_2$ $C_4H_6 \cdot 2CuCl \cdot 4H_2O \rightarrow C_4H_6 + Cu_2Cl_2 + 4H_2O$		17-20 25 31 44 56 64 69	0.0171 0.0427 0.0763 0.190 0.556 1.091 1.529	These data are dissociation pressures at given temperature points for the anhydrous complex.	E. R. Gilliland, H. L. Bliss, and C. E. Kip, J. Am. Chem. Soc. 63, 2,088-2,090 (1941); cf. Thesis of Christgau, Massachusetts Institute of Technology (1939).
Dissociation of butadiene cuprous chloride complexes $C_4H_6 \cdot 2CuCl \rightarrow C_4H_6 + Cu_2Cl_2$ $C_4H_6 \cdot 2CuCl \cdot 4H_2O \rightarrow C_4H_6 + Cu_2Cl_2 + 4H_2O$	A solution of the complex in aqueous acetonitrile was heated.	71.1	1	B yield = ?	E. V. Fasce (assignor to Standard Oil Development Co.), U. S. Patent 2,275,135 of March 3, 1942.
Dissociation of butadiene cuprous chloride complexes $C_4H_6 \cdot 2CuCl \rightarrow C_4H_6 + Cu_2Cl_2$ $C_4H_6 \cdot 2CuCl \cdot 4H_2O \rightarrow C_4H_6 + Cu_2Cl_2 + 4H_2O$	A solution of the complex in ethene glycol acetonitrile, plus calcium chloride was heated.	73.9-76.7	1	B yield = ?	Ibid.
Dissociation of butadiene cuprous bromide complex $C_4H_6 \cdot 2CuBr \rightarrow C_4H_6 + Cu_2Br_2$		0 13 25 40.7 47	0.075 0.222 0.513 1.008 1.618	These data are dissociation pressures at given temperature points for the anhydrous complex.	E. R. Gilliland, H. L. Bliss, and C. E. Kip, J. Am Chem. Soc. 63, 2,088-2,090 (1941); cf. Thesis of Christgau, Massachusetts Institute of Technology (1939).
Dissociation of butadiene silver nitrate complex $C_4H_6 \cdot 2AgNO_3 \rightarrow C_4H_6 + 2AgNO_3$	An aqueous solution of the complex was heated or evacuated.	Heated Room temperature	1 (when heated) Vacuo (when not heated)	B yields = ?	I. G. Farbenindustrie A.-G., British Patent 303,323 of Jan. 3, 1929; P. Feiler (assignor to I. G. Farbenindustrie A.-G.), U. S. Patent 1,795,549 of March 10, 1931.
Dissociation of butadiene silver nitrate complex $C_4H_6 \cdot 2AgNO_3 \rightarrow C_4H_6 + 2AgNO_3$		20 (?)		Dissociation implied but not described.	V. G. Moor, M. I. Dement'eva, E. K. Kanep, and A. V. Shilyaeva, Transactions of the Research Plant "Khimgaz," Materials on Cracking and Chemical Treatment of Cracked Products 2, 157-164 (1935); Translation S-153 of Feb. 6, 1942, Universal Oil Products Co. Survey of Foreign Literature.
Dissociation of butadiene mercuric acetate complex		20 (?)		Dissociation implied but not described.	Ibid.
Dissociation of butadiene mercurous nitrate complex $C_4H_6 \cdot 2HgNO_3 \rightarrow C_4H_6 + 2HgNO_3$	An aqueous solution of the complex was heated or evacuated.	Heated Room temperature	1 (when heated) Vacuo (when not heated)	B yields = ?	I. G. Farbenindustrie A.-G., British Patent 303,323 of Jan. 3, 1929; P. Feiler (assignor to I. G. Farbenindustrie A.-G.), U. S. Patent 1,795,549 of March 10, 1931.

Refinery IDEAS

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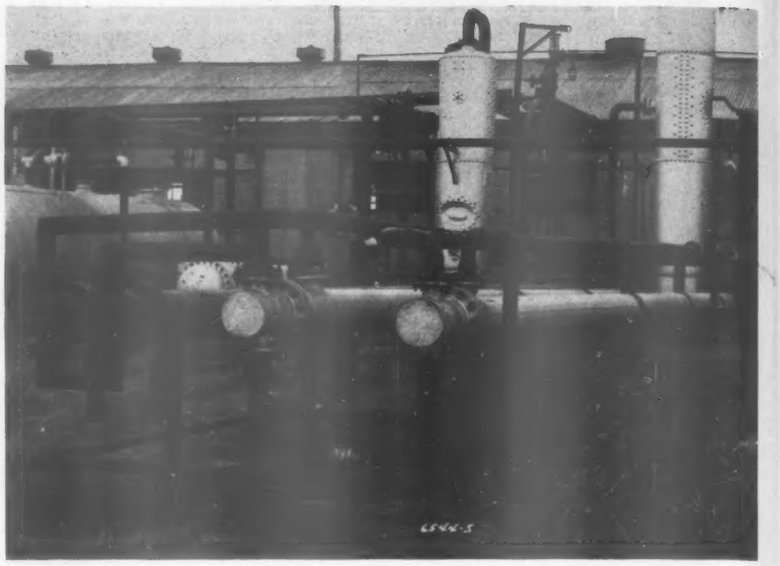
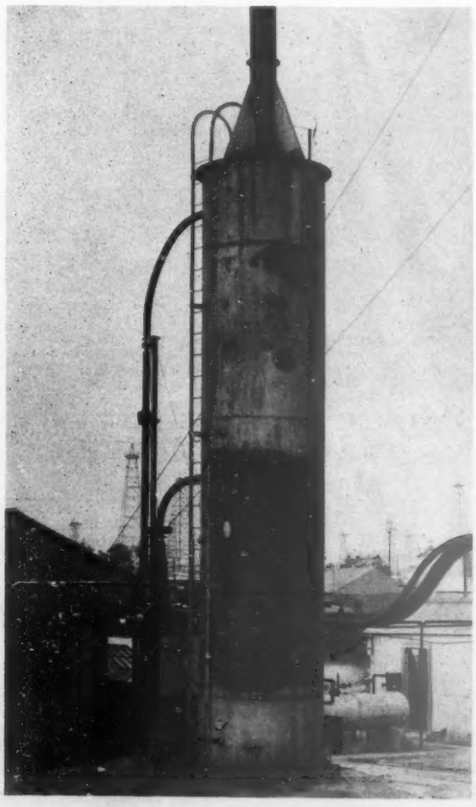


Reclaimed Pipe For Heat Exchangers

Faced with the need for additional heat-exchanger capacity in a vapor-recovery plant, and unable to get early delivery on new, commercial equipment or materials, an East Texas refiner built his own exchangers, using reclaimed pipe. The shells are built of 12-ft. sections of 10-in. pipe. The double-circuit tube sections are of 1-in. pipe.

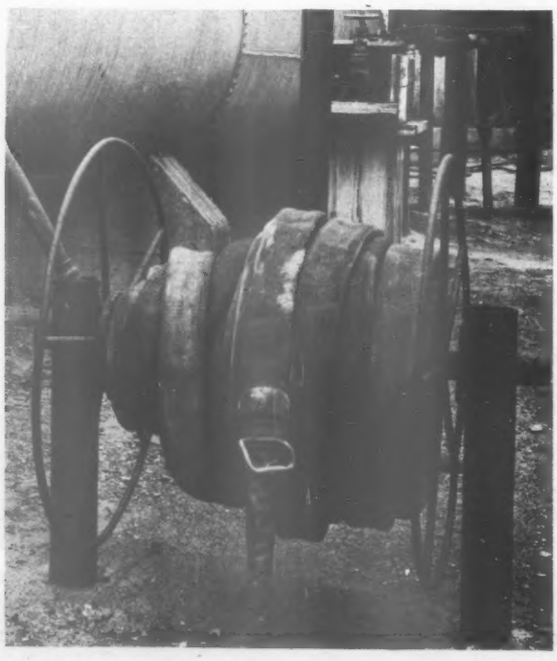
Old Absorber Converted Into Reboiler

An old absorber has been converted by a Texas refinery operator into a reboiler handling heavy ends from a stabilizing column in a vapor-recovery plant. Baffling and plates inside the absorber were removed and coils for the circulation of the stabilizer bottoms were installed in the shell. Heat is provided by gas burners fitted in the bottom of the column. Not only has the refiner been saved the purchase of critical war materials now hard to obtain but unusually satisfactory and efficient results have been obtained.



Buffer Driven by Steam Turbine

In a small Texas refinery, a buffing machine was needed to clean tube sections of a cracking furnace. Conventional units usually are powered by small electric motors but in this case the electrical equipment was not available. As a substitute, the operator made use of a steam turbine from an old generating unit.



Fog Nozzles to Combat Fire

Uncertainties of keeping supplied with sufficient fire-extinguishing chemicals and chemical equipment have led an East Texas refinery to arrange to combat fires by means of water, using fog nozzles. Fire hydrants and hose reels are placed at many places around the plant. It was found that fires could be controlled with water with fog nozzles when the stream is directed at the bottom of the fire. This creates steam which has a snuffing effect on the fire. Chemicals are used only when the fires are small.

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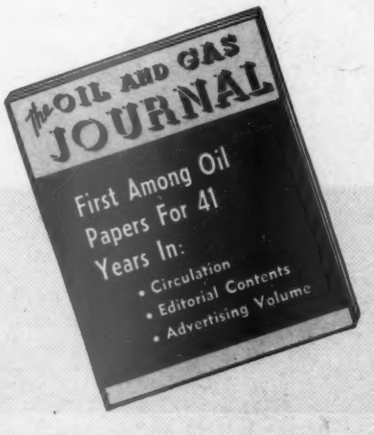

THE OIL AND GAS JOURNAL
TULSA, OKLAHOMA

Progress in METALS

By W. L. NELSON

Study of Cast Iron in Elevated Temperature Operation

(Published by request of the National Academy of Sciences, National Research Council, War Metallurgy Committee.)

In accordance with the usual policy of relieving overburdened industries by encouraging the use of more readily available substitute materials whenever possible, the War Production Board has approved a field research project to study the possibility of utilizing cast iron in operations at elevated temperatures (in excess of 450° F.). This program is being conducted by the War Metallurgy Committee, National Academy of Sciences, Washington, D. C., with the cooperation of the American Foundrymen's Association. Messrs. T. E. Barlow, Vanadium Corp. of America, and, C. O. Burgess, Union Carbide and Carbon Research Laboratories, have been appointed to obtain the desired data. Since time is vital in a project of this type these men have requested the cooperation of industry in locating specific applications in which cast iron is being or has been used, successfully or otherwise, at temperatures in excess of 450° F. The information obtained during this study will be reported statistically and the actual details of operation will be kept confidental when desired.

Engineers, foundrymen, field service men and others who have information on performance records of cast iron at elevated temperatures can make a valuable contribution to the ferrous industry and the war effort by contributing their knowledge and experience to this study. Detailed information or suggestions as to possible sources of such information, pertinent to the subject, should be sent to either T. E. Barlow, 2440 Book Building, Detroit, Mich., or C. O. Burgess, 4625 Royal Avenue, Niagara Falls, N. Y.

Magnetic Methods of Sorting Steel Scrap

In the present hurry of production, mix-ups of steel parts are bound to occur. In junk piles the entire history of a steel part may be lost and hence these methods along with other methods which have been mentioned on the Progress in Metals page: May 15, 1941, p. 61, Identification of Steels by Sparks; December 18, 1941, p. 46, Scrap Piles Contain Valuable Alloy Elements; March 12, 1942, p. 54, Identification of Nickel in Alloy Steels; July 2, 1942, p. 44, How to Identify Your Nickel-Steel Scrap, may constitute the basis by which a more comprehensive sorting system may be devised. Obviously, the means employed in various plants will vary because of the kinds of scrap that are encountered.

A method devised by the Westinghouse Electric & Manufacturing Co., is described by C. S. Williams in the November 1941 issue of Metals and Alloys.

"The device was originally assembled in one afternoon in our laboratories for the purpose of 'unscrambling' a mixture of tough and brittle iron fittings to be used in lighting systems. All the fittings were alike in appearance and composition but some had been heat treated and some had not; the untreated fittings were brittle and would break in service.

"The device was built by hooking up four pieces of standard laboratory electrical apparatus and winding two small hollow coils of fine wire. One piece of apparatus was an oscilloscope, a device which makes electrical waves trace a visible path on a glass screen. When a fitting was inserted into one of the hollow coils, a green line on the oscilloscope screen told whether or not it has been heat treated.

"The test was based on the balancing of magnetic fields in the two coils. With a standard casting in one coil, when the tough, treated iron was placed in the other coil of wire carrying an electric current, the magnetic field was increased more than when the brittle, untreated iron was tested. A straight line on the oscillograph indicated equal magnetic fields in both coils.

"The method can be used to sort all kinds of small steel or iron parts that have different effects on a magnetic field, such as mixtures of high-alloy and plain carbon steels, mixtures of cementitic and ferritic irons, mixtures of properly and improperly treated high-speed steel tools, etc."

Another nondestructive electrical method of sorting high and low carbon content steel scrap is described in the Shop Notes of Metals and Alloys for May 1942. This method depends upon the fact that high-carbon steels retain their magnetism through a heating operation, to a greater degree than do the low-carbon steels. In describing the method, R. H. Grace states:

"Approximately 20,000 stampings had been made and sent to the heat treating department before it was discovered that S.A.E. 1010 had been mixed with S.A.E. 1095. On this particular part it appeared feasible to use either steel, provided one could be separated from the other and the proper heat treatment applied.

"To separate the mixture, use was made of the fact that hardened steel retains magnetism to a greater degree than does soft steel. All of the parts were heated in a controlled atmosphere furnace to 1,425° F. and quenched in oil. After the heat treatment they were placed across the poles of a U-shaped magnet for approximately 10 seconds. If no suitable permanent magnet is available, a magnetic chunk can be used.

"The magnetized parts were then spread out on a wooden table for sorting. A bar of soft iron, in this case the 'keeper' of the magnet, was brought into contact with each piece. Parts of S.A.E. 1095 retained sufficient magnetism to be appreciably attracted to the bar, whereas parts of S.A.E. 1010 were unaffected.

"The hardened S.A.E. 1095 parts were then tempered at 800° F.; the soft S.A.E. 1010 parts were retreated in cyanide at 1,600° F. and oil quenched. Toughness and wear resistance tests showed the finished products to be acceptable."

Metal Working Terms

Drilling and Reaming

The common operation of *drilling* involves impressing against the metal a revolving bit which has relieved edges along the shank that are formed in a spiral to carry the chips out of the hole during the process. The hole so produced is not always of true dimensions and hence a drilled hole is often smoothed by forcing a *reaming* tool through it. This tool has fluted edges which cut the inner surface only enough to smooth it and bring the diameter of the hole to the desired dimension.

A hookup for "unscrambling" metal fittings. Courtesy Westinghouse Research Laboratories.

CO$T Engineering

A WEEKLY FEATURE OF THE OIL AND GAS JOURNAL PRODUCTION

DECEMBER 24, 1942

SELECTION OF METHOD SHOULD BE BASED ON ECONOMICS

THE primary purpose of engineers engaged in the oil industry is not simply to recover oil but to recover it at a continuously less expenditure of manpower, material and money. The oil industry was getting the oil aboveground before the engineers were employed but it has been largely the work and efforts of these same engineers that brought down drilling and producing costs so oil companies could continue showing a profit in face of increased taxation and other costs.

Much of the saving has been due to an increased application of reservoir control and much of it to improved equipment and better maintenance practice. These are the products of engineers engaged in the oil industry, but less time is spent on them than on the solution of production problems. Generally all parts of the problem, regardless of whether it is one of reservoir control, equipment selection, or equipment maintenance, are analyzed beforehand and the anticipated profits calculated before any step is made toward inaugurating the plan. Unless there is some radical change in conditions, such as a drop in price of oil or the loss of the market, the predictions of the reservoir-control engineer are generally found to be true. The same is true of the equipment selection and maintenance programs.

This cannot always be claimed for the more routine matters and the dispatching of the numerous daily details. The principal difficulty in most cases is the absorption of the man in the particular problem, or in a phase of it, to the point where sight of the main objective is lost.

A particular example is that of testing of all alternatives, an extremely important phase of engineering work. An elaborate testing program, or one which goes into too much detail, may fail because the mass of data obtained can never be adequately analyzed by the available manpower and only serves to confuse the situation. Too skimpy information resulting from inadequate testing is a complete waste of money, however, as the conclusions from such data are undependable.

Present conservation regulations being what they are, it is not uncommon for state administrative bodies to request certain tests and as such bodies do not have to bear the brunt of the expense, the economics of the case are never seriously considered. Where a whole field is involved the operators thrash the matter out and arrive at the least expensive way of getting the desired information. As the plan is carried out on a mass-production basis, the cost is not excessive. For instance, in one area the sonic-wave method is widely used for determining fluid levels in wells and due to the volume of business done by the service companies the charge is quite reasonable. To make a few such tests, or only one, in an isolated area would run the cost up excessively.

An unfortunate case is the operator who is requested by a state regulatory body for a test on a specific well. He has neither the moral nor the vocal support of his neighbors. Consequently it is up to the engineer employed by the operator to consider this item from the economic angle and design the least expensive method for obtaining the data. It may even be necessary to dissuade the regulatory authorities, or at least get them to amend the procedure.

One recent case was on an isolated lease with seven wells, one of which was to be tested for a 30-day period by the request of the state regulatory body. Originally the tank battery had been designed with two separators so a test of short duration could be made on any well while production was continued on the others. Tankage included three 500-bbl. tanks. On checking the situation the engineer found that either a separate tank would have to be installed, some of the other wells shut in, an inordinate amount of mileage for the switcher and gager charged to the test, or a considerable amount of oil tied up (subject to evaporation losses) while the test was made.

After figuring the cost of the various testing methods and the future recovery and operating expense of the well, the engineer determined that the value of the well did not justify the expense of such a test and that it would be cheaper to abandon it. He was successful in proving this to the engineers of the regulatory body and arrived at a compromise which satisfied them and which did not add to the operating expense of the lease.

One of the interesting facts developed during this brief investigation was the high cost of the car mileage involved in what is often a routine or commonplace task. Such expense is not commonly charged directly to the lease operation but it must come from the revenue of the company and hence comes from the income of the property, directly or indirectly. Needless to say, a car-mileage-reduction plan was started.

Another example is afforded by the investigation of the cost of some special equipment considered for use in making pumping tests. The object was to get a highly portable arrangement which could be moved quickly and cheaply. The equipment needed to accomplish the portability was quite expensive. Investigation showed that tests to be made were not numerous and were of long duration. Calculated on a per-test basis, it was found that the cost of the portable unit for this work was much more than the conventional skid type.

Designing portable equipment for a job paid dividends in another case. The original intention was to revise the lease flow lines and tank batteries so that accurate monthly tests could be obtained of wells on a repressure project. It was found that the cost of making the changes was considerable. The engineer then obtained metering equipment of sufficient capacity to test the wells, mounted it in a small second-hand trailer with adequate quick connections and was able to get proper tests at a low figure per well.

Tests can be considered from the following angles: (1) Is the test necessary? (2) What is its value? (3) How much will it cost? (4) Is it worth it? (5) Are there alternate methods which will give satisfactory results which will cost less?

DEVOTED TO COST ESTIMATIONS, OPERATING CALCULATIONS AND PROFIT MAKING

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Engineering Fundamentals

A WEEKLY FEATURE OF THE OIL AND GAS JOURNAL No. 59

DECEMBER 24, 1942

BALANCE METHOD OF DETERMINING SPECIFIC GRAVITY OF NATURAL GAS

THE effusion method of determining the specific gravity of natural gas has been replaced to a large extent by the balance method. Although the effusion apparatus has the advantage of being easily portable and requiring a relatively short time for obtaining readings, it has the disadvantage of yielding results that are not sufficiently accurate for all purposes. It was found that results were often in error as much as 2 per cent, and in some cases as much as 10 per cent of error could occur without recognizable defects in the apparatus or procedure.

The gravity balance has been developed so that it produces a finer degree of accuracy than can be obtained with the effusion apparatus. The balance is easily portable and does not require excessive time for making a specific gravity determination.

The design of the gravity balance is based on two laws of physics, which are:

1. Under conditions of constant temperature, the density of a gas is directly proportional to pressure. (Boyle's law.)

2. A body immersed in a fluid is buoyed up by a force equal to the weight of the fluid displaced. (Archimedes principle.)

The essential features of the gravity balance are shown in Fig. 1. A hollow bulb (*A*) is built of light metal and designed so as not to change in volume when subjected to varying pressure. The bulb is attached to a beam (*B*) and counterbalanced by an adjustable weight (*C*). The beam rests or is suspended on a frictionless support (*D*). A pointer (*E*) indicates on a scale (*F*) when the beam is in balance. All of the above-mentioned items are enclosed in a pressure-tight case (*H*) which is fitted with a window (*I*) for observing the position of the pointer and with valve connections for a pump (*J*), bleeder (*K*), and a manometer (*L*).

The weight (*C*) is movable along the beam (*B*) and its position can be adjusted on the beam so that when case (*H*) is evacuated the bulb (*A*) will rest in a downward position However, when gas or air is introduced into the case (*H*), the buoyant force of such gas or air will act upward on the bulb (*A*). When the density of the gas or air becomes high enough due to increased pressure, that the weight of air or gas displaced by the bulb (*A*) is sufficient to raise the bulb, the pointer (*E*) will indicate a balanced position. Since the specific gravity of natural gas is ordinarily less than 1, meaning that the density of gas is less than that of air, gas must be under a greater pressure than air in order to produce the buoyant force necessary to bring the beam (*B*) to balanced position.

By a consideration of Archimedes' principle and Boyle's law, the following mathematical relation can be derived:

$$G = \frac{Pa}{Pg}$$

where,

G = specific gravity of the gas.
Pa = absolute pressure at which beam balances in air.
Pg = absolute pressure at which beam balances in gas.

(*Pa* and *Pg* may be expressed in any pressure units, such as pounds per square inch or inches of mercury, so long as both are in the same units and are absolute pressures.)

The adjustable weight (*C*) should preferably be set so that the beam will balance as near to atmospheric pressure as possible, in order to reduce the case (*H*). This means that as a general rule the reading with gas is taken with a pressure above atmospheric pressure in the case, and the reading with air is usually taken with a pressure below atmospheric pressure in the case.

Gravity readings accurate to the third decimal place can be obtained if a few precautions are observed. The balance should be mounted and levelled on a rigid support. A tripod is commonly used as a mounting in the field. The balance should be set up in the shade and protected from the wind, if possible. Readings using gas and air should be taken as close together as possible. If there is delay between the two readings or any other conditions which might cause the gas temperature and air temperature to be different, temperature readings should be taken and a suitable correction made.

Example 1.

Problem. — A specific-gravity test was made using the balance method and the following data were taken: Pressure at which beam balanced when the case contained gas = 6 in. of Hg, gage. Pressure at which beam balanced when the case contained air = 4.40 in of Hg, vacuum.

Atmospheric pressure = 28.35 in. of Hg.

Solution:

Pg = 28.35 + 6.00 = 34.35 in. of Hg. abs.

Pa = 28.35 — 4.40 = 23.95 in. of Hg abs.

$$G = \frac{23.95}{34.34} = 0.697$$

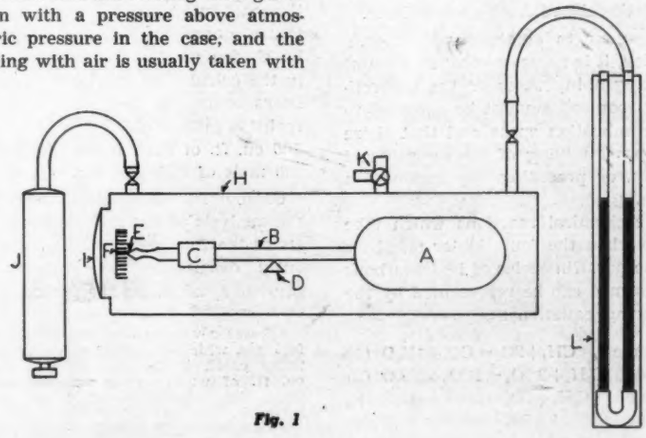

Fig. 1

Series prepared by Glenn M. Stearns, associate professor of petroleum engineering, University of Oklahoma

Engineering Fundamentals

A WEEKLY FEATURE OF THE OIL AND GAS JOURNAL No. 60

DECEMBER 24, 1942

COMBUSTION OF NATURAL GAS

THE principal uses of natural gas involve the combustion of the hydrocarbon compounds which constitute the gas. For all burner applications from the small domestic consumer to the large industrial plant, natural gas furnishes a clean, and relatively cheap, source of heat.

Natural gas as it is generally used in burner applications has been stripped of any readily condensible hydrocarbons. These heavier hydrocarbons that are removed are used for blending with gasoline in making motor fuel, and for other purposes. Thus the combustible portion of natural gas is generally the two lightest members of the paraffin series of hydrocarbons; namely, methane and ethane. Small percentages of propane and even traces of butane may be present in some samples of natural gas as it is distributed for fuel.

The process of combustion of a hydrocarbon constituent of natural gas represents a chemical reaction in which the carbon and hydrogen in the fuel unite with oxygen from air to form carbon dioxide, or carbon monoxide and water. Heat is released by such a reaction.

It is desirable in most applications that the burning be complete. If the burning of the gas is complete the products resulting from the chemical reaction are carbon dioxide and water. The presence of carbon monoxide in flue gases leaving a boiler or furnace is evidence that combustion is incomplete. Other more apparent evidences of incomplete combustion are: (1) The presence of soot (free carbon) in the flue; (2) a yellow flame as distinguished from a blue flame.

In order to obtain complete combustion, it is necessary that an amount of oxygen in excess of the theoretically required amount be supplied to the combustion space and that there be proper mixing of the oxygen and gas in, or preceding, the combustion space.

The chemical reactions which take place when the four lighter members of the paraffin series of hydrocarbons are burned can be represented by the following equations:

Methane $CH_4+2O_2 \rightarrow CO_2+2H_2O$ (1)
Ethane $C_2H_6+3.5O_2 \rightarrow 2CO_2+3H_2O$ (2)
Propane $C_3H_8+5O_2 \rightarrow 3CO_2+4H_2O$ (3)
Butane $C_4H_{10}+6.5O_2 \rightarrow 4CO_2+5H_2O$ (4)

It is well to understand clearly the meaning of the combustion equations given above. Each of them represents the proportion between the volumes or weights of the particular hydrocarbon, the required oxygen, the carbon dioxide formed, and the water formed.

For example, Equation 1 signifies that for the combustion of 1 mol of methane 2 mols of oxygen are required, while 1 mol of carbon dioxide and 2 mols of water will be formed. The relations between the volumes of the various gaseous compounds will be the same as that of the mols. That is, for 1 cu. ft. of methane, 2 cu. ft. of oxygen are theoretically required for combustion, while 1 cu. ft. of carbon dioxide will be formed.* In such a volume relationship, all gas volumes must be considered at the same conditions of pressure and temperature. In so far as weights of the various compounds are concerned, Equation 1 states that 16 lb. of methane will combine with 64 lb. of oxygen to form 44 lb. of carbon dioxide and 36 lb. of water. It should be noted that since matter cannot be created or destroyed the total weight of the compounds (methane and oxygen) entering into the reaction must equal the total weight of the products (carbon dioxide and water) formed.

Similarly, Equations 2, 3 and 4 represent relations existing between mols, volumes, or weights of compounds involved when the other hydrocarbons are burned. Most combustion calculations are founded upon the combining proportions represented by these equations.

When solving combustion problems the most satisfactory method requires that a convenient basis for calculation be chosen so that the various steps in the calculation will be comparable. Bases commonly used are: 1 mol of fuel, 100 mols of fuel, 1 cu. ft. of fuel, 100 cu. ft. of fuel, 1 mol of flue gas, 100 mols of flue gas, etc.

Combustion calculations necessitate the analysis of the fuel, or the analysis of the flue gas, or both. As previously discussed,* gas analyses are generally taken and reported on a volume basis, which is numerically equal to the analysis on a mol basis. These analyses, due to the method by which they are obtained, are on a dry basis, i.e., they do not take into account any water present in the gas being analyzed.

The fact that oxygen used for combustion comes to the burner in the form of air must be considered in making combustion calculations. As stated in Installment 57, air is composed of 20.9 per cent oxygen and 79.1 per cent nitrogen by volume. Then, each cubic foot of atmospheric oxygen used for combustion is accompanied by 79.1/20.9, or 3.78 cu. ft. of nitrogen; or each mol of oxygen is accompanied by 3.78 mols of nitrogen.

In the absence of contamination, a natural gas cannot be expected to contain free oxygen, since oxygen is a quite active element and if present would have combined underground with some other substance to form another compound. So, generally speaking, the oxygen involved in a combustion calculation is supplied from air.

Another fact that should be remembered is that any nitrogen entering a furnace in either the fuel or the air is inert. That is, the nitrogen does not react with any other substance; it enters and leaves the combustion space as free nitrogen.

In many cases the fuel will contain no nitrogen. If this is true, certain calculations are simplified. For example, the amount of nitrogen in the flue gas can be used in calculating the amount of air entering a furnace. If there is little or no nitrogen in the fuel, the percentage of excess air may be calculated from the flue gas analysis, even though the analysis of the fuel (natural gas) is unknown. The term *percentage of excess air* as used here denotes the per cent of air in excess of that theoretically required for complete combustion.

Another calculation relating to combustion is concerned with the amount of water formed by the combustion of the gas. The total moisture content of flue gas is due to the water formed by combustion and also due to any moisture content of the fuel and air entering the furnace.

In the next installment, calculations will be given to illustrate principles mentioned in this discussion.

*If water vapor is considered as a perfect gas, which is sufficiently accurate in many cases, it can also be said that 2 cu. ft. of water vapor will be formed from the combustion of 1 cu. ft. of methane.

*Installments 13 and 57.

Series prepared by Glenn M. Stearns, associate professor of petroleum engineering, University of Oklahoma

REFINERY ACTIVITY AND EXPANSION

Twenty-Eight Companies Hold Contracts For Aviation-Fuel Manufacturing Plants

WASHINGTON, D. C.—A list of contracts for the production of aviation gasoline was contained in a report made public last week by Secretary of Commerce Jesse H. Jones covering the activities of the Reconstruction Finance Corporation and its subsidiaries as of October 31, 1942.

The report gave relatively few details about any of the many war activities of this group by government corporations, but some of the information had not been revealed previously.

Commitments made by the Defense Plant Corp. include $189,662,963 for production of aviation gasoline, while commitments made by Defense Supplies Corp. include $1,499,906,141 for the purchase of aviation gasoline and component parts and aviation gasoline-plant expansion, the report stated. Gasoline and component parts were listed as alkylate, alkylate plants, 100-octane gasoline, 91-octane gasoline, aviation-gasoline plants, aviation-gasoline base stock, benzene, butanes and butylenes, and catalyst for use in gasoline production. The report stated:

"The most extensive domestic procurement program instituted by Defense Supplies Corp. to date is that involving high-octane aviation gasoline. In order to assure adequate supplies of this most important material, Defense Supplies Corp., at the request of the Army, Navy, and the Petroleum Administration for War, has entered into contracts with substantially all refineries which are now, or expect to be, equipped to produce aviation gasoline, and in consideration of their agreement to produce aviation gasoline on a large scale, the corporation contracts to purchase their production. This production, which will involve substantially the entire quantity of 100-octane aviation gasoline produced in the United States and its territories, will be distributed to the armed forces of this country and its allies. The contracts are made with the cooperation of the Petroleum Administration for War."

The report stated that contracts have been made with the following companies for the operation of 28 plants in the aviation-gasoline program:

J. S. Abercrombie and Harrison Oil Co., American Cyanamid & Chemical Corp., Anderson-Prichard Refining Corp., Ashland Oil & Refining Co., Associated Refineries, Inc., Bay Petroleum Corp., Charter Refining Co., Chicago Chemical Co., Cities Service Refining Corp., Continental Oil Co., Crown Central Petroleum Corp., Diakel Corp., Eastern States Petroleum Co., Inc., Frontier Refining Co., Great Southern Corp., Houdry Process Corp., Mohawk Petroleum Corp., National Refining Co., Pennzoil Co., Premier Oil Refining Co. of Texas, Pure Oil Co., Republic Oil Refining Co., Root Petroleum Co., Southport Petroleum Co. of Delaware, Standard Oil Co. of Louisiana, Terminal Refining Corp., Utah Oil Refining Co., and Wilshire Oil Co., Inc.

The report stated that Defense Plant Corp. is committed to $16,044,748 to finance toluene production.

A summary table stated that Defense Plant Corp. has financed or contracted to finance plants for synthetic rubber, including butadiene, styrene and other bases, to a total of $679,012,420, although in another part of the report it was stated that the estimated cost of all plants and facilities in the synthetic-rubber program aggregates $564,361,220.

Rubber Reserve Co. and Defense Plant Corp. have arranged with 67 rubber, oil, chemical, utility, and other companies to provide, construct or operate plants and facilities for the annual production of 663,000 tons of butadiene, 172,500 tons of styrene ,and other necessary chemicals and catalysts, to be used in the manufacture for Rubber Reserve Co. of four types of synthetic rubber, viz., the butadiene-styrene-copolymer type 705,000 tons annually, butyl rubber 132,000 tons, neoprene 60,000 tons, and thiokol 50,000 tons, a total rated capacity of 947,000 tons of synthetic rubber per annum, which, with a reasonable factor of safety, should produce substantially more than 1,000,000 tons. These arrangements were made prior to the appointment of the rubber director. The president's rubber-survey committee stated that the program was technically sound, and in the hands of capable engineers, contractors and operators.

The 67 plants in the program are to be operated by the following companies:

American Car & Foundry Co., Atlas Oil Co. of Louisiana, Barium Reduction Corp., Buffalo Electro Chemical Co., Carbide & Carbon Chemicals Corp., four plants; Cities Service Oil Co., Consolidated Oil Corp., Copolymer Corp., Crown Central Petroleum Co., Davison Chemical Co., two plants; Dow Chemical Co., four plants; Eastern States Petroleum Co.; E. I. duPont de Nemours & Co., two plants; Ethyl Corp.; Filtros, Inc.; Firestone Tire & Rubber Co., three plants; General Synthetic Co., B. F. Goodrich Co., four plants; Goodyear Tire & Rubber Co., four plants; Hancock Oil Co. of California; Humble Oil & Refining Co., two plants; Koppers United Co., two plants; Magnolia Petroleum Co.; Monsanto Chemical Co.; National Synthetic Rubber Corp.; Neches Butane Products Co.; Pacific Gas & Electric Co.; Pan American Petroleum Co.; Phillips Petroleum Co.; Publicker Commercial Alcohol Co.; Quaker Oats Co.; Q. O. Chemical Co.; Shell Chemical Co.; Sinclair Refining Co.; Sinclair Rubber, Inc.; Southern California Gas Co.; Southport Petroleum Co.; Standard Oil Co. of California; Standard Oil Co. of Indiana; Standard Oil Co. of Louisiana, three plants; Sun Oil Co.; Thiokol Corp.; United States Rubber Co., three plants; Ugite Sales Corp., and Westvaco Chlorine Products Corp.

Sketches of Plant Operators . . .

DON V. EELS, manager of Cities Service Oil Co.'s refinery at Ponca City, Okla., rose to his present post through application of his training in chemical engineering.

First experience in the oil industry dates back to school-vacation periods when Mr. Eels worked for various oil companies around Cushing, Okla. Permanent work in the industry has been exclusively with Empire-Cities Service companies, principally at Cushing, Tulsa, Ponca City and Okmulgee, Okla. His experience covers practically all phases of refinery operations, including 12 years as superintendent of the Okmulgee plant.

After the Okmulgee plant was closed, he was transferred to Ponca City and, for a time, devoted full attention to special engineering studies. Subsequently, he became assistant plant manager at Ponca City and last July, when Lee N. Haugen was transferred to the East Chicago refinery, Mr. Eels was promoted to his present position.

His hobbies are varied, including photography, bowling, hunting, fishing and travel in the hills and mountains of North America. Few people have been as diligent in seeking out various mountain regions, both by auto and then on foot or horseback.

Principal civic activities include membership on the Ponca City Board of Education and on the advisory committee for National Defense Schooling. He is a member of the American Legion and the Society of Automotive Engineers. Mr. Eels is married and has three daughters.

Humble Moving Todd City, Tex., Refinery to Gulf Coast Area

Humble Oil & Refining Co. was reported this week to be preparing to move one of its refineries from Todd City to Bay City, Tex. The plant is in the East Texas area about 15 miles from Palestine and was operated on oil from the Boggy Creek field and other East Texas sources.

Sun's Butadiene Plant To Cost $3,254,420 Gross

Gross expenditure of $3,254,420 is being made by Sun Oil Co. on its butadiene plant being built for the Defense Plant Corp., at Akron, Ohio. The actual value of the material to be used is $1,720,000.

The new plant will utilize the Houdry combined two-stage dehydrogenation process for the production of 15,000 tons of butadiene per year. An advantage of this process and the design used, the company asserts, is that such a plant can be completed and placed in operation within 6 months after construction has started. After the war, a plant of this particular type may be converted into a unit for the production of high octane gasoline and components of aviation gasoline at reasonable cost, the company's publication, "Our Sun," says in the current issue.

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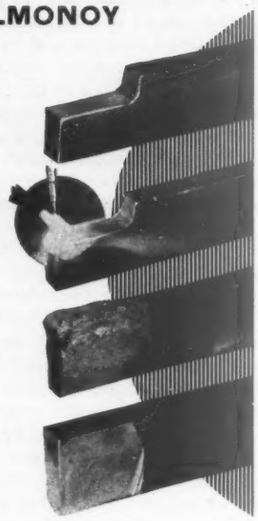

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THE OIL AND GAS JOURNAL

Pipe-Line Activity

Plans Are Discussed for 20-In. Products Line

WASHINGTON, D. C.—Two routes have been under discussion for a proposed 20-in. products line from the Gulf Coast refining points to the East Coast. One of these would take a more direct course than the War Emergency Pipeline route which would make it 35 miles shorter, but this saving would be more than offset by higher construction and future operating costs. This route would extend near the following points: Monroe, La.; Greenville, Miss.; Nashville, Tenn., and Charleston, W. Va.

A second proposal for a more economical route would have the line go from Houston, Tex., via the Beaumont-Port Arthur, Tex., area, to a point on the War Emergency Pipeline right-of-way near Bald Knob, Ark. From there on eastward, it would be parallel to the W.E.P. line. By following this second route, construction costs would be reduced by avoiding some rough mountainous country and by taking advantage of work already done in clearing right-of-way for the W.E.P. line. The stations under construction and planned for the W.E.P. line could be enlarged to provide pumping facilities for the 20-in. products line. The same operating and maintenance staff could take care of both the 24-in. crude line and the 20-in. products line. The same communication system could be used with an extension from Bald Knob to the Gulf Coast.

W.E.P. Advances Several Key Executives, Changes Titles

WASHINGTON, D. C.—As a result of changes in titles of key executives of War Emergency Pipelines, Inc., at the Little Rock, Ark., office, A. N. Horne is now vice president and assistant general manager. Since the beginning of this organization he has served as vice president and general superintendent. Oscar Burden has been advanced from assistant general superintendent to general superintendent. B. E. Hull continues to direct operations as vice president and general manager. Oscar Wolfe becomes permanently attached to the W.E.P. organization as chief engineer. Formerly he was chief engineer of the Texas Co.'s production department. L. D. Witter is now treasurer and comptroller.

War Emergency Pipelines, Inc., has set up the following divisional headquarters:

Division 1, Norris City to Mount Sterling, Ohio, O. E. Stimson, construction superintendent, 401 First National Bank Building, Hamilton, Ohio. Division 2, Mount Sterling, Ohio, to McConnelsburg, Pa., D. S. Patton, construction superintendent, 525 Fayette Title & Trust Building, Uniontown, Pa. Division 3, McConnelsburg, Pa., to Bayonne, N. J., George F. Brigance, construction superintendent, 603 Woolworth Building, Lancaster, Pa.

A. L. Hooper, assistant right-of-way and claim agent, has headquarters at the Lancaster, Pa., office.

Stanley L. Westlake, superintendent, Ajax Pipe Line Corp., has been spending time recently with the W.E.P. organization in connection with making arrangements for terminals at the end of the line in the New York refining area.

At the end of last week more than 514 miles of pipe had been laid for the Texas-Illinois leg of the W.E.P. 24-in. crude-oil line, leaving about 17 miles to be laid. By the end of this week it is expected that with good weather conditions all of the 24-in. pipe will have been laid between Longview, Tex., and a point beyond the Mississippi River in Illinois. Construction of stations is progressing. Some grading and clearing of right-of-way has been going on at locations along the route of the extension from Norris City, Ill., to the New York-Philadelphia refining areas.

Elsewhere in this issue there appears an account of arrangements made by which Defense Supply Corp. will buy all oil at Longview, Tex., which is to be shipped through the W.E.P. line. The program provides for allowing those delivering at Longview, Tex., to purchase equivalent amounts at East Coast terminals. In the East Texas area oil is going into storage preparatory to filling the line to Norris City, Ill.

Oklahoma Pipe Line Applies for Permit for Hewitt Extension

Oklahoma Pipe Line Co. has applied to the War Production Board for a permit to build 10 miles of 10-in. pipe to connect the company's Hewitt, Okla., station with the trunk line of Stanolind Pipe Line Co. This hookup is to be part of the program for Project 1 for increasing the flow of crude from Texas through existing systems to the East Coast. Stanolind Pipe Line Co. has been building loops in North Texas to increase capacity of its system.

Stanolind has completed a 28-mile loop, representing more than half of the 54 miles of 12-in. in the looping program. Oklahoma Pipe Line expects to start construction of the 10-mile connecting line as soon as permission is granted.

Texas Pipe Line Progresses With Louisiana Outlet

Texas Pipe Line Co. has under construction a 200-mile 10-in. pipe line from the Bateman Lake and Paradise oil fields of coastal Louisiana to Port Neches, Jefferson County, Texas. It will extend from Port Neches to a point about 20 miles east of the Erath field, Vermilion Parish, Louisiana. From there it will swing southeast with two 8-in. lines to the Bateman Lake pool in St. Mary Parish, a distance of 50 miles. From the Bateman Lake pool one 8-in. line will be continued to the Paradise field in St. Charles Parish about 10 miles west of the Mississippi River. Texas Pipe Line Co. is using old pipe from the old Del Rio to Lytle line in southwest Texas of Illinois Pipe Line Co. purchased some time ago by Texas Co.

DPC Spends $102,850,000 For Four Pipe Lines

Defense Plant Corp., has authorized expenditures of $102,850,000 for four pipe lines for the transportation of petroleum products from Texas and the Middle West overland and through inland waterways. This figure was disclosed in Washington, D. C., last week in a report made on the activities of Reconstruction Finance Corp., and its subsidiaries by Jesse H. Jones, secretary of commerce.

A portion of the report applying to pipe lines follows:

"A 24-in. line was planned to extend from Longview, Tex., to Salem, Ill., a distance of 530 miles, at an estimated cost of $35,000,000. This line is now being continued to Philadelphia, Pa., and

New York, an additional distance of 857 miles, at an additional cost estimated at $60,000,000.

"An 8-in. line across northern Florida, a distance of 198 miles, at a cost of $3,000,000.

"An 8-in. line from Greensboro, N. C., to Richmond, Va., a distance of 175 miles, at a cost of $3,600,000, to connect with existing systems from Texas.

"An 8-in. line from Fostoria to Akron, Ohio, a distance of 82 miles, at a cost of $1,250,000 to connect with existing Ohio lines which terminate at Philadelphia and Newark, N. J.

"The last three mentioned lines will be built principally from second-hand materials and facilities. Other pipe lines may be necessary."

Socony-Vacuum Extension To Sioux Falls Approved

Extension of Socony-Vacuum Oil Co., Inc., products line from Topeka, Kans., to Sioux Falls, S. D., was approved last week by the facilities branch of the War Production Board.

Merger Approved by New York Transit Stockholders

Stockholders of New York Transit Co., at a special meeting last week, approved by a vote of more than 73 per cent of outstanding stock a plan for unification of the company, Northern Pipe Line Co., Buckeye Pipe Line Co. and Indiana Pipe Line Co.

Shareholders of all other companies concerned already have approved the proposed unification plan which provides that the various organizations merge not later than February 28.

Under the proposed plan, the Indiana company would be merged into Buckeye, and this organization would acquire all of the stock of a new Pennsylvania corporation to which the assets of Northern Pipe Line would be transferred, and all of the stock of a New York corporation to which the assets of New York Transit would be transferred. The existing New York and Pennsylvania corporations then would be dissolved.

Construction of W.E.P. Feeder System Goes Ahead

WASHINGTON, D. C.—The laying of lines required by the program for feeding War Emergency Pipelines, Inc., 24-in. line is being carried on on the Gulf Coast as well as in the East Coast area. This program involves the utilization of four crude lines and one gas line, plus approximately 50 miles of local lines near Longview, varying from 4 to 14 in., on which Williams Brothers Corp. are now at work.

The big feeder projects are: Sun-Stanolind line from Beaumont to Longview, Tex., to carry 40,000 bbl. per day of heating oils; Shell line, Houston to Longview, Tex., 35,000 bbl. of heating oils; Pan American line, Houston to Longview, 55,000 bbl. of heating oils; Atlantic line, Port Arthur to Longview, 40,000 bbl. of crude. Conversion of the Magnolia 14-in. gas line from Vanderbilt, near Corpus Christi, to Houston, Tex., and construction of 55 miles of connecting link from used pipe to deliver 75,000 bbl. daily of crude and heating oils to Houston for transshipment to Longview via Shell and Pan American lines.

American Liberty Pipe Line Wins Suit on Crude Buying

AUSTIN, Tex.—Contention of American Liberty Pipe Line Co. that an oil producer cannot file and prosecute a suit on behalf of the state because a pipe line refuses to purchase his oil, was sustained by the Austin, Tex., Appellate Court last week. The court reversed a lower tribunal decision and ordered it abated as to the petition of W. M. Agey, suing in behalf of the state. Mr. Agey had contended the pipe line had unlawfully discriminated against him in East Texas by refusing to take his oil. The Travis County District Court had awarded plaintiff a judgement for $5,800.

Texas Empire Transfers Ownership of Texas Line

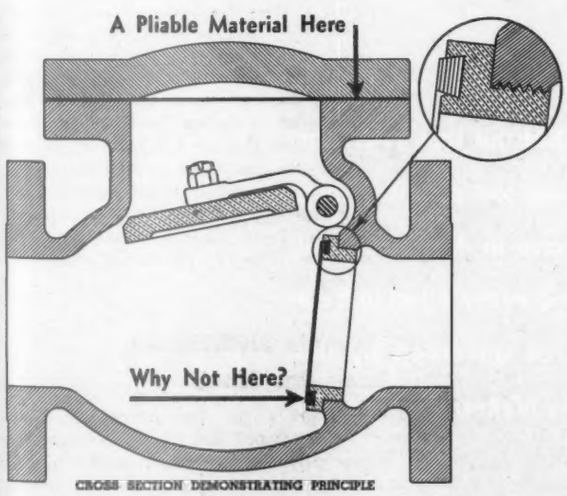
Tidal Pipe Line Co., Empire Pipeline Co. and The Texas Pipe Line Co., each has acquired as of December 1, 1942, an undivided interest in the physical property formerly operated as the Texas Empire Pipe Line Co. of Texas.

Each of the companies will operate and transact business over this system. The property of the Texas Empire Pipe Line Co. of Texas consisted of a 12-in. pipe line extending from Nettleton, Gregg County, Texas, to Port Arthur, Jefferson County, Texas, with the required pumping stations and tankage.

Valuation of Pipe Lines In Texas Increases

AUSTIN, Tex.—Valuation of pipe lines according to state tax records just announced amount to $100,670,832 for 1942, an increase of $2,743,195 over the preceding year. Value of the intangibles held by pipe-line companies amounted to $36,813,560, a drop of $7,683,345 for the year.

WHEATLEY'S SYNTHETIC RUBBER SEAL
Full Opening Check Valve



CROSS SECTION DEMONSTRATING PRINCIPLE

AVAILABLE IN SIZES FROM 2" to 24"
AND IN SERIES 15-30-40-60
SBE-FBE-SOE & FOE

- The rubber ring conforms to all deposits and obstacles and makes it possible for this valve to seal under the worst conditions.
- Specified for gathering lines. Less pressure required for positive seal than with the metal to metal seal which depends entirely on pressure.
- The rubber ring, itself, can be replaced from our stock and no machine work is necessary for installation.
- No lapping or grinding of seats necessary.
- Absolutely silent in operation. Ideal for refineries and pumping stations where the slapping of metal check valve clappers is annoying.
- Seals regardless of viscosity. Operates equally well on kerosene or crude.
- Removable bronze seat ring, into which the rubber ring is inserted, can be replaced by the standard metal to metal seat, if desired.
- No additional charge for Synthetic Seal feature.

Write for Bulletin J-1224

WHEATLEY PUMPS *and* VALVES
TULSA, OKLAHOMA

Season's Greetings

WE'RE sending you greetings this year — though we wish it were possible to convey them in person. But the last year has made many changes for us also and we have lost so many men we just can't call on you as often as we have in the past. Until the time comes when we can, we are making every effort to help win this fight, so that again nations will be governed by the principles expressed in *"Glory to God in the highest and on earth peace, good will toward men"*

FRED E. COOPER • • • ALLIS-CHALMERS

FIELD DEVELOPMENTS...

HIGHLIGHTS FROM THE WEEK'S NEWS—

The recommendation of the Regulatory Practices Committee of the Interstate Oil Compact Commission that a minimum price of not less than 5 cents per 1,000 cu. ft. be placed on gas will doubtless provide a topic for many lively discussions. It has frequently been stated that state regulatory bodies and conservation acts are concerned with prevention of waste and not with price. Yet here is an apparent price-fixing proposal.

This is not the first time in which minimum prices have been set by state authorities. Probably the most important cases were the occasions on which fields have been shut down by governors until a satisfactory minimum price had been posted by purchasers. This emphatically prevented waste as, obviously, a producer has to produce more than four times as much oil at 25 cents to make the same return as he would obtain at $1.00. This would give flush fields a great advantage over those on settled production which would be shut down by the flood from the big producers. The over-production of the latter group would dissipate energy and hasten the day of artificial lift and higher production costs. It would also waste much gas and oil.

How does all this affect the present proposal of a 5-cent minimum on gas at the well? Proponents of the idea admit that producers and royalty owners would like it but consider that this is merely incidental to the principle of prevention of waste that is involved. Gas comes from two kinds of wells, gas wells and oil wells. In the latter, the production of gas is incidental to that of oil. If the wells have a gas-oil ratio of 1,500:1 and an allowable of 25 bbl. of oil, then the average well produces 37,500 cu. ft. of gas daily. If it can be sold, it is sold. If it cannot be sold it is generally blown in the air.

The market for gas is seasonal. There is markedly less demand in the summer than in the winter. If casinghead gas is to have priority over gas from gas wells, these will be restricted, possibly below the economic limit in the summer. This would work against the gas producer so casinghead gas admittedly takes second place in the market, which may be no place at all.

It is well known that gas returned to the reservoir will aid production of oil but this costs money and lacking unitization of a pool it is rarely carried out. Expressed in terms of dollars and cents, the oil from the wells referred to above brings in $30.00 a day and the gas wasted runs in many cases from $1.87 at ½-cent to $5.62 at 1½ cents which is hardly worth worrying about. However, at 5 cents a thousand, this gas would theoretically be worth $18.75 or more than 60 per cent of the value of the oil. What is more, with a fixed minimum, if it can not be sold this year, it will be sold sometime so that there is a greater incentive to return the gas to the formation, recycling it as often as necessary because each trip it makes adds to profits and keeps producing costs down. If the addition to income through recycling is inadequate to pay this cost, the operator still has a reservoir partially filled with gas which he can sell profitably. As oil production drops, he can count on the possible conversion of some oil lines to gas lines where it would not pay the gas company to lay a line for the incidental casinghead gas production.

This appears to be another example where conservation pays the producer and protects a natural resource whose value is steadily increasing. The cost of gas is a rather minor item in the expense of getting it to the consumer so that the additional cost to him of more than doubling the price paid for gas in the field would be a relatively small percentage of his monthly gas bill. It would materially lengthen the time that natural gas would be available to him and before he would have to take the major jump in going from natural to manufactured gas rates.

SOUTHWEST TEXAS: The second test in the new Poth field has been shut in and derrick and rig have been temporarily removed. Several new wildcat operations are reported in the lower Gulf Coast territory. (p. 57).

OKLAHOMA: A Noble County discovery which had previously made large flows of oil was completed as a small pumper and two large producers have been added to the East Watchorn pool. (p. 57).

LOUISIANA GULF COAST: Production in the Bayou Sale area of St. Mary Parish has been extended to the west and production in the Pine Prairie area of Evangeline Parish has been extended a short distance southward. An Evangeline Parish wildcat is to be completed in two sands and operators are still trying to kill a flowing wildcat in Acadia Parish. (p. 58).

NORTH CENTRAL TEXAS: The Scotland pool in Archer County has been extended and a promising Strawn sand pool opened 4 miles north of Scotland has been shut down following collapse of casing. (p. 63).

CALIFORNIA: Another producer has been completed in the Turnbull Canyon field but production is much less than expected from the large amount of oil sand present. A test in the western end of the Aliso Canyon field, Fresno County, has been completed as a large flowing well and proves the deep Sesnon zone to be highly productive in that area. (p. 62).

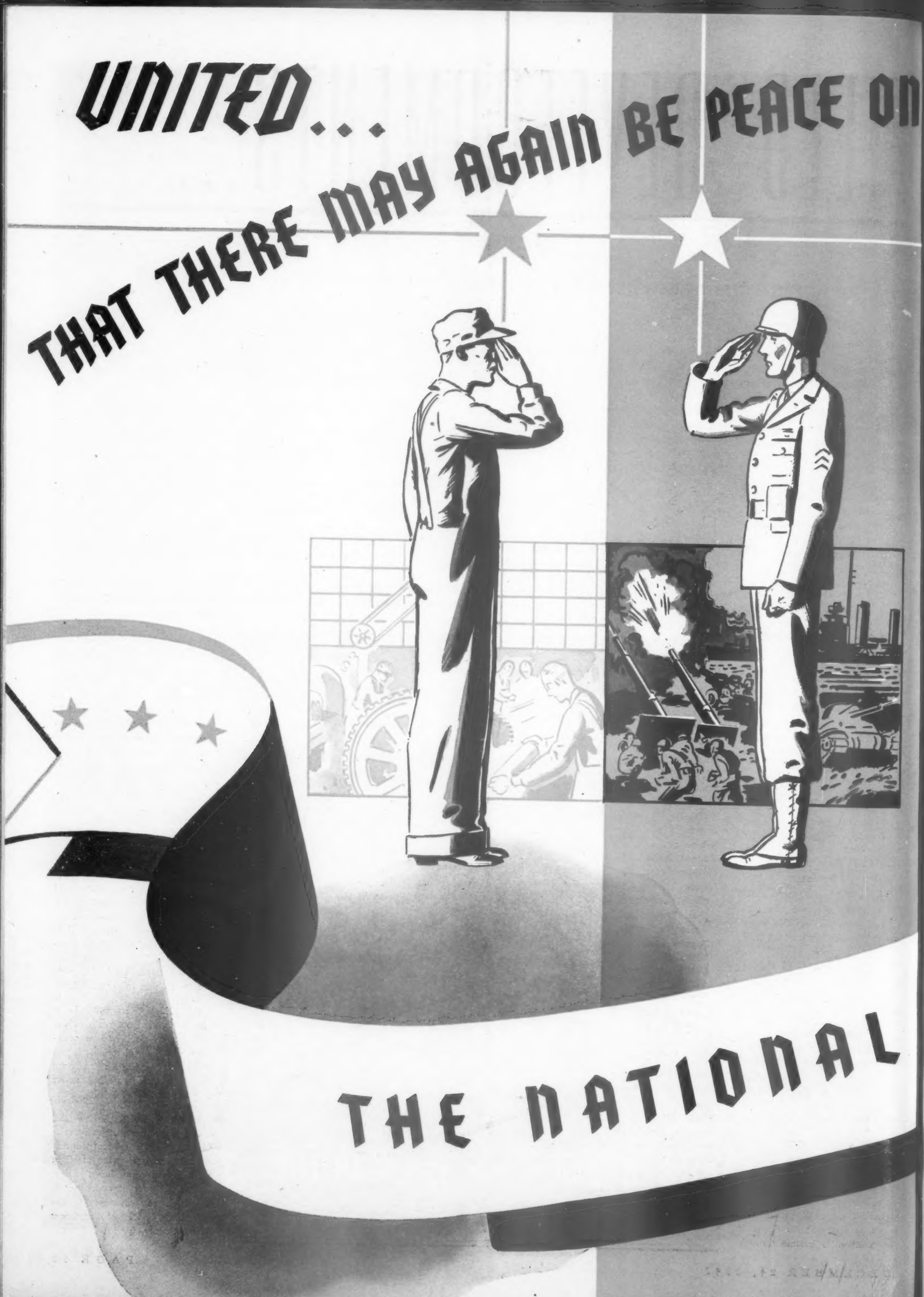
ILLINOIS: A new McClosky pool is in prospect north of the Phillipstown pool and a westward extension of the Armistead pool is indicated. An important Devonian test is getting under way in the Patoka field. (p. 61).

PERMIAN BASIN: A new pool is in prospect in southeast Crane County where a wildcat test has encountered a showing of oil in the Simpson sand. Location has been staked for a west offset to the Tubb pay discovery in the Monahans pool of northeast Ward County. (p. 59).

COMPLETIONS IN ALL FIELDS . . .

(Week Ended December 19, 1942)

	Oil	Gas	Dry	Total	Footage	Ttl. comp. to date 1942	Ttl. comp. to date 1941
N. Y., Pa., and W. Va.	43	16	2	61	127,927	3,430	5,235
Ohio	3	10	2	15	45,220	1,112	1,506
Indiana	1	1	6	8	13,568	344	451
Kentucky	3	0	0	3	6,931	252	597
Illinois	24	0	15	39	102,282	1,838	3,221
Michigan	1	1	8	10	18,537	673	802
Kansas	11	0	14	25	87,309	1,523	1,902
Nebraska	0	0	1	1	4,635	35	75
Missouri, Iowa	0	0	0	0	0	13	33
Oklahoma	12	4	10	26	83,244	1,168	1,652
Texas:							
North Central Texas	5	0	6	11	30,017	1,052	2,511
West Texas	15	0	4	19	84,563	1,264	1,985
Texas Panhandle	6	3	1	10	33,068	340	596
Eastern Texas	2	0	1	3	14,640	394	929
Texas Gulf Coast	4	0	8	12	86,500	672	959
Southwest Texas	7	0	4	11	56,777	1,013	1,652
Total Texas	39	3	24	66	305,565	4,735	8,632
North Louisiana	3	1	2	6	26,887	484	682
Louisiana Gulf Coast	5	0	2	7	64,863	455	751
Total Louisiana	8	1	4	13	91,750	939	1,433
Arkansas	2	0	1	3	14,995	181	176
Mississippi and Southeast	0	0	1	1	11,802	79	246
Montana	2	1	0	3	5,776	202	258
Wyoming	0	0	0	0	0	108	156
Colorado, Utah	0	0	0	0	0	24	28
New Mexico	10	0	2	12	40,453	258	246
California	35	0	7	42	110,963	797	988
Total United States	194	37	97	328	1,070,957	17,711	27,637
Total previous week	166	40	101	307			
Week ended Dec. 20, 1941	405	65	140	610			


UNITED...
THAT THERE MAY AGAIN BE PEACE ON
THE NATIONAL

KANSAS, NEBRASKA

Dunns Mill and Stucky Pool Discovery Wells Completed

By CARL HOOT

INTEREST in Kansas' activity, like Oklahoma, centered around field wells, with no important strikes reported from wildcatters. Two discoveries, reported previously, were completed. In Harvey County H. M. Williams 1 Stucky opened the Stucky pool with a potential of 9 bbl. of oil and 2,000,000 cu. ft. of gas, and in Butler County Deep Rock Oil Corp. 1 Eckels swabbed 20 bbl. of oil an hour, was acidized and given state potential of 3,000 bbl., to open the new Dunns Mill Arbuckle lime pool.

One good well and one dry hole were added to the new Lindsborg Southwest pool of McPherson County. Auto Ordnance Corp. 1 Bengstrom, W½ NW SE 25-17-4w, swabbed 30 bbl. of oil an hour in Viola at 3,384-89 ft. and the same company's 1 Oakleaf, W½ SW NW of Section 25, found the Viola dry at 3,468 ft.; total depth was 3,548 ft. The Bengstrom well is an east offset to the discovery and the 1 Oakleaf is a northwest offset.

KANSAS COMPLETIONS

Wildcats

Barton County: Hollow Drlg. 1 Debes, W½ SW NW 30-17s-11w, dry, T.D. 3,414 ft., Lansing 3,052 ft., show oil 3,150 ft.

Butler County: Deep Rock 1 Eckels, E½ SE NW 32-29-4e, swabbed 20 bbl. an hr., acidized, potential 3,000 bbl., Arbuckle 2,954-64 ft., discovery.

Harvey County: H. M. Williams 1 Stucky, NE NE 3-23-3w, flowed 9 bbl. oil and 2,000,000 cu. ft. gas, Lansing 2,358-3,277 ft., discovery.

Phillips County: Carter and Stanolind 1 Vogel, NE SW 26-3-19w, dry, T.D. 3,586 ft., Lansing 3,172 ft., Arbuckle 3,540 ft.

Reno County: J. J. Lynn 1 Krehbiel, SE SE SE 10-26-7w, dry, T.D. 4,391 ft., Mississippi lime 3,881 ft., Viola 4,247 ft., Simpson 4,273 ft., Arbuckle 4,361 ft.

Rush County: Vickers Pet. 1 Steitz, S½ SW SE 17-19-18w, dry, T.D. 4,085 ft., Lansing 3,560 ft., sand 3,975 ft., Arbuckle 4,035 ft.

Saline County: E. S. Adkins 1 Weis, NE NE SW 32-14-2w, dry, T.D. 3,470 ft., Lansing 2,027 ft., Mississippi lime 2,679 ft., Hunton 3,068 ft., Viola 3,233 ft., Simpson 3,423 ft., Arbuckle 3,446 ft.

Fields

Chase, Rice County: Bishop Oil 2-A Callis, SW NE SE 22-19-9w, dry, T.D. 3,256 ft.

Crowther, McPherson County: Westgate-Greenland 1-B Crowther, 2½ SW SE 22-17-1w, dry, T. D. 2,737 ft., Mississippi chat 2,714 ft.

Iuka, Pratt County: Skelly 1 Luders, SW NW SE 7-27n-12w, pumped 352 bbl., Simpson 4,247-49 ft., T.D. 4,252 ft.

Kraft-Prusa, Barton County: Texas 2 Radenberg, SE NE 5-17-11w, pumped 106 bbl., Arbuckle 3,337-51 ft.

Cities Service 1 Ney, SW SW 8-16-11w, pumped 522 bbl., Arbuckle 3,292-96 ft.

Black-Marshall 3 Krier, SE NW 18-16-11w, 3,000 bbl., Arbuckle 3,292-3,311 ft.

Lindsborg, McPherson County: Auto Ordnance 1 Bengstrom, W½ NW SE 25-17-4w, swabbed 30 bbl. an hr., Viola 3,384-89 ft.

Lindsborg Southwest, McPherson County: Auto Ordnance 1 Oakleaf, W½ SW NW 25-17-4w, dry, T.D. 3,548 ft., Viola 3,468 ft.

Vickers Pet. 1 Hoffman, W½ SE SW 25-17-4w, 1,733 bbl., Kinderhook 3,390-97 ft., T.D. 3,537 ft.

Peace Creek, Reno County: Barnsdall 3 Blasdell, SW SE NW 13-23-10w, pumped 65 bbl., Viola 3,759-68 ft.

Auto Ordnance 2 Hollenbeck, SW NW SW 28-23-10w, dry, T.D. 3,810 ft.

Ray, Phillips County: Cities Service 1 Reese-E, SW SW SE 28-5-20w, 1,629 bbl., Lamotte sand 3,570-78 ft., T.D. 3,692 ft.

Russell, Russell County: Phil-Han 1-A Boxberger, NE NW SE 33-13-14w, dry, T.D. 3,324 ft.

Russell North, Russell County: British-American and Aylward 2 Ehrlich, SW NW NW 15-13-14w, dry, T.D. 3,329 ft., Lansing 3,003 ft.

Shutts, Ellis County: Wolf Creek 1-D Bemis, W½ SW SE 33-11-17w, pumped 45 bbl., Arbuckle 3,518-52 ft.

Stoltenberg, Ellsworth County: Pruntv Prod. 1 Haggy, NW NE 20-16-10w, dry, T.D. 3,359 ft.

Stull, Barton County: Darby Pet. 1 Bushnell, S½ SW SW 6-16-12w, dry, T.D. 3,375 ft., Lansing 3,089 ft., conglomerate 3,368 ft.

Trapp, Russell County: Great Lakes 2 Maag, SE NE SW 7-15-13w, dry, T.D. 3,316 ft.

FOREST CITY BASIN

ST. JOSEPH, Mo.—Missouri's first deep oil well reported water in the Bartlesville sand after deepening to 1,454 ft. The well, Cities Service 1 Jim Cook, 4 miles south of Tarkio in Atchison County, had indications of a 25-bbl. well when water entruded at 1,448 ft. Shut in overnight, the hole filled several hundred feet with water. Operators were endeavoring to cement the water off and if successful will shoot the sand.

NEBRASKA COMPLETIONS

Lincoln County: Texon Oil Royalty 1 State-Melton, NW NW 16-9n-33w, dry, T.D. 4,635 ft.

OKLAHOMA FIELD REPORT

Noble County Wildcat Completed As Small Pumping Well

By CARL HOOT

COMPLETIONS in proven areas overshadow wildcat development over the past week. The one wildcat completed successfully was Kubat et al 1 Tyer, 6 miles south of Watchorn in Noble County. Previously the well had made a showing for a good well, flowing as much as 115 bbl. of oil in 1 hour, by heads. However, after drilling to 4,356 ft., total depth, and plugging back to 4,090 ft., it settled to 20 bbl. pumping.

Two large producers were added to the East Watchorn pool of Pawnee County. At the north end of the pool L. H. Wentz 1 fee flowed 882 bbl. from Wilcox at 3,855-83 ft. and on the west side Alma Oil Co. 3 Robedeaux flowed 1,020 bbl. a day from the sand at 3,947-58 ft., one of the field's largest wells.

Other field wells of interest included Continental 1 Meyers, SW NW SW 26-17n-4w, in the Crescent pool of Logan County, which flowed 451 bbl. of oil a day in Layton sand at 4,942-59 ft. In Pottawatomie County, the same company expanded the north end of the Brooksville pool with a 240-bbl. well, flowing, in Hunton lime at 4,773-4,812 ft.

OKLAHOMA COMPLETIONS

Wildcats

Noble County: Kubat et al 1 Tyer, NE NE SW 7-21n-3e, pumped 20 bbl., Mayes 4,028-60 ft., T. D. 4,356 ft., P. B. 4,090 ft., discovery.

Pontotoc County: Creekmore-Rooney 1 Busby, NW SW SE 11-4n-5e, dry, T. D. 2,504 ft., Caney 1,518 ft., Hunton 2,119 ft., Viola 2,253 ft., Trenton 2,309 ft., dolomite 2,405 ft.

Seminole County: H. Diamond et al 1 Moore, NE SW SE 14-10n-5e, dry, T. D. 4,735 ft., Bartlesville 3,871 ft., Hunton 4,473 ft., Viola 4,642 ft., Wilcox 4,725 ft.

Stephens County: Coline Oil 1 Ford, NE SE 24-1n-6w, dry, T. D. 2,520 ft., top Pennsylvania 1,615 ft.

Fields

Brooksville, Pottawatomie County: Continental 2 Baker, SW NE SE 33-9n-3e, flowed 240 bbl., Hunton 4,773-4,812 ft.

Carter County: Samedan Oil 1 Tomlinson, NE SW SW 13-5s-1e, flowed 497 bbl. in 12 hr., sand 3,963-4,115 ft., T. D. 4,205 ft.

Crescent, Logan County: Continental 1 Meyers, SW NW SW 26-17n-4w, flowed 451 bbl., Layton 4,942-59 ft.

Sinclair-Prairie 3 Short, SW NE NE 27-17n-4w, pumped 15 bbl., Layton 4,955-76 ft., T. D. 4,983 ft.

Cromwell, Seminole County: J. E. Hall 1 Hulwa, NW NW NE 11-10n-7e, dry, T. D. 3,640 ft., Cromwell 3,614 ft.

Dilworth gas, Kay County: Adkins Oil 1 Hoxenik, NW SE 26-28n-1w, 1,750,000 cu. ft. gas, sand 810-817 ft., T. D. 3,676 ft., P. B. 1,010 ft.

Sledge, Pontotoc County: W. A. Delaney 1 John Goodson, NE NE 27-5n-5e, pumped 210 bbl., Viola 2,535-86 ft.

W. A. Delaney 1 Goodson, SE NE 27-5n-5e, dry T.D. 2,650 ft. in Viola.

Empire, Stephens County: C. B. Christie 1-B Cummings, SE SE NW 27-1s-8w, dry, T. D. 2,303 ft.

Lovell, Logan County: Sinclair-Prairie 2-A Knecht, NW NE 28-18n-4w, flowed 70 bbl., Wilcox dolomite 5,967-6,034 ft.

Watchorn, East, Pawnee County: L. H. Wentz, 1 fee, SE SE SE 23-23n-3e, flowed 882 bbl., Wilcox 3,855-83 ft.

Alma Oil 3 Robedeaux, NW SE 26-23n-3e, flowed 1,020 bbl., Wilcox 3,947-58 ft.

Wewoka Townsite, Seminole County: Jordan Pet. 1 Orr, NW NW SW 16-8n-8e, dry, T. D. 4,271 ft., Hunton 3,950 ft.

Wynona, Osage County: Cities Service No. 485, SW NW NW 16-24n-9e, 5,000,000 cu. ft. gas, Burgess sand 2,258-65 ft.

SOUTHWEST TEXAS

Second Test in New Poth Field Shut Down

By T. F. SMILEY

CORPUS CHRISTI, Tex.—Superior Oil Corp. of Oklahoma 1 G. J. Groos, which gave promise of adding another producer to the new Poth field in Wilson County, has withdrawn, temporarily at least, as an active figure in South Central Texas operations. The well, in the David Holt Survey and the second one for the Poth field, is now standing shut in at a total depth of 4,314 ft. in shale. Rig and derrick have been removed, and it is understood the well will remain down until Superior has a rig available to move in.

Five wildcat tests were getting under way in the Lower Gulf Coast territory. Bridwell Oil Co., which chalked up a dry hole in its Refugio County test, was moving in machinery for another attempt in the same survey, the John Sinnott, 9 miles northwest of Refugio. Others in varying stages of progress were Sun 1 D. D. Oil Co., in the El Benedito grant, Hidalgo County; Republic Natural Gas Co. 1 L. A. Straube, I.&G.N.R.R. Survey 501, Jim Wells County; Southern Minerals Corp. 1 Hawkins & Wallis, San Diego de Abajo Julian and Ventura Flores grant; Jay Simmons and Republic Natural Gas Co. 1 Dr. T. A. Anderson, George H. Paul subdivision of Coleman-Fulton Pasture Co. subdivision.

Phillips' wildcat 2 M. B. Mastin, in Delores I.&A. Survey, Nueces County, reached a depth of 5,800 ft. without encountering encouragement. Gulf 2 Virginia Tatton, in the Essey Reed Survey, Refugio County, at total depth of 8,380 ft., made a drill-stem test with perforations at 7,998-8,012 ft. and 1/4-in. chokes. It recovered the water cushion and 5,000 ft. of salt water, no working pressure. The perforations then were squeezed.

Rowan & Hope 1 Mrs. M. E. McCampbell, a wildcat test in the V. Garcia Survey, Victoria County, was coring at 5,146 ft., without having found anything promising. It topped the Discorbis at 4,247 ft.

LOWER GULF COAST COMPLETIONS

Wildcats

Refugio County: Bridwell Oil Co 1 Ida C. and A. Wood est., J. Sinnott Sur., top Greta 3,650 ft., dry at 3,898 ft.

Fields

Clara Driscoll, Nueces County: Magnolia 6 Clara Driscoll, old T.D. 5,408 ft., squeezed old perforations, perf. 3,804-06 ft., 9 bbl. (16 bbl. fluid, 62% s.w.) through 5/64-in. choke, T.P. 400 lb., C.P. 1,200 lb., gas-oil ratio 850 lb.

Seeligson, Jim Wells County: Magnolia 33 Seeligson, Jos. Jabincillos gr., 97 bbl. through 7/64-in. choke, T.P. 600 lb., C.P. 1,000 lb., gas-oil ratio 655, T.D. 5,950 ft.

Shell 16 Seeligson, Willis Millican Sur. 335, 152 bbl. through 7/64-in. choke, T.P. 1,175 lb., C.P. 1,175 lb., gas-oil ratio 754, T.D. 6,016 ft.

Sun 2 P. Canales, old T.D. 5,210 ft., new T.D. 5,406 ft., 3,400,000 cu. ft. gas open flow.

South Caesar, Bee County: Luling Oil & Gas Co. 6W-B Tom Slick est., W. F. Hodges Sur., A-175, 240 bbl. through 5/32-in. choke, T.P. 1,050 lb., C.P. 1,100 lb., gas-oil ratio 400, T.D. 6,622 ft.

Seaboard 1 Tom Slick, E. Stapp Sur., 236 bbl. through 1/8-in. choke, T.P. 1,025 lb., C.P. 1,150 lb., gas-oil ratio 552, T.D. 6,585 ft.

Stratton, Kleberg County: Humble 22 King ranch-Paso Ancho, 66 bbl. through 5/64-in. choke, T.P. 1,520 lb., C.P. 2,375 ft., gas-oil ratio 1.088, T.D. 6,604 ft.

SOUTH TEXAS COMPLETIONS

Wildcats

Duval County: Argo Oil Corp. 1 J. R. Scott, G.B.& C.N.G.R.R. Sur. 231, A-994, dry at 6,543 ft.

Starr County: Baldridge & King and Navarro 2 F. B. Guerra, Santa Cruz Gr., dry at 6,005 ft.

Zapata County: Harvey Mecom 1 fee, Jose Borrego Gr., water well, dry at 3,125 ft.

Fields

Colorado, Jim Hogg County Humble 4 T. T. East, Los Moritas Gr., 42 bbl. through 3/16-in. choke, T.D. 3,139 ft.

SOUTH CENTRAL TEXAS COMPLETIONS

Dale, Caldwell County: Ralph R. Ogden 18 F. H. Talley, W. S. Swearingen Sur., A-262, 40 bbl. on pump, T. D. 2,290 ft.

TEXAS GULF COAST

Wilcox Field Opened on Orange Hill Prospect, Austin County

By T. F. SMILEY

HOUSTON, Tex.—Definitely opening a new Wilcox sand field on the Orange Hill prospect of Austin County, Ohio Oil Co. 1 Roy Kaechele, in the V. Flores Survey, was completed at total depth of 10,110 ft., plugged back to 9,273 ft. The discovery flowed 8,757,000 cu. ft. of gas and 105 bbl. of distillate through ½-in choke, with perforations at 9,052-67 ft. Tests at other depths were encouraging. This new productive area is in the line of development work being carried on in Colorado, Lavaca, De Witt, and Karnes counties, to the southwest. To the east, in Harris County, Humble Oil & Refining Co. a little earlier brought in its 1 L. L. Scharff, producing 9,900,000 cu. ft. of wet gas and thus extending the Katy gas and distillate field of Waller County.

Resumption of drilling on H. D. Hunt 1 J. R. Yeager, in the A. Long Survey, Grimes County, has carried that hole, abandoned as dry last July to a depth of 5,345 ft. It topped the Cook Mountain at 375 ft., Sparta 850 ft., Weeches 1,103 ft., Queen City 1,340 ft., Reklaw 1,520 ft., Wilcox 1,810 ft., Midway 5,120 ft.

Grey & Wolfe were at 11,921 ft. in 1 Grogan-Cochran Lumber Co., a wildcat in the A. Prather Survey of Montgomery County, and were testing.

TEXAS GULF COAST COMPLETIONS

Wildcats

Austin County: Ohio 1 Roy Kaechele, V. Flores Sur. A-160, 3 mi. SE of Orange Hill, pref. 9,052-67 ft., 105 bbl. distillate and 8,757 cu. ft. gas through ½-in. choke, T.P. 1,500 lb., C.P. 2,300 lb., gas-oil ratio, 83,401, T.D. 10,110 ft., P.B. 9,273 ft., discovery.

Harris County: McDannald Oil Co. 3 East Texas Oil Co., Victor Blanco Sur., dry at 4,518 ft.

Jackson County: Harrison & Abercrombie 1 Taylor-Bagby, G. Sutherland Sur., dry at 7,150 ft.

Walker County: F. R. Jackson and B. B. Orr 1 S. J. Bishop, J. Wood Sur. A-593, dry at 4,040 ft.

Fields

Danbury, Brazoria County: Humble 1-C Bassett Blakely, H.T.&B. Sur., dry at 7,910 ft.

Fairbanks, Harris County: Landreth Producing Co. 2 W. D. Southerland, S. S. Reynolds Sur., A-1695, O.W.W.O., old T.D. 6,879 ft., squeezed old perf., perf. 6,816-27 ft., 24,000,000 cu. ft. gas open flow.

Katy, Waller County: Stanolind 1 Freeman, H.&T.C. Sur., O.W.W.O., old T.D. 11,080 ft., P.B. 7,235 ft., 100,000,000 cu. ft. wet gas open flow.

Lucky, Matagorda County: Stanolind 3 L. and F. Huebner, dry at 8,950 ft.

Mayo, Jackson County: Texas 3 B. Simicek, G. F. and M. T. Simons Sur., A-293, 152 bbl. through 1/8-in. choke, T.P. 825 lb., C.P. sealed, gas-oil ratio 840, T.D. 5,540 ft.

Mustang Creek, Jackson County: Renwar Oil Corp. 1 C. Smith, William Menefee Sur., A-53, dry at 6,882 ft.

Needville, Fort Bend County: Gulf 1-B H. C. Ehlert, F. Firster Sur., A-470, dry at 11,134 ft.

Spindletop, Jefferson County: Stanolind John A. Veatch Sur., A-55, dry at 5,891 ft.

Stowell, Jefferson County: Glenn H. McCarthy 1 B. R. Prox, B. A. Vaccocu Sur., A-53, 326 bbl. through 9/64-in. choke, T.P. 1,060 lbs., C.P. 900 S. I., gas-oil ratio 561, T.D. 8,813 ft.

West Mauritz, Jackson County: Gulfboard Oil Corp. A-1 Mauritz Bros., M. L. York Sur., A-312, 140 bbl. through 1/8-in. choke, T.P. 700 lb., C.P. sealed, gas-oil ratio 359, T. D. 5,582 ft.

Season's Greetings

from Gulf States

General Offices: Beaumont, Texas; Baton Rouge, and Lake Charles, Louisiana

DEPENDABLE GULF STATES UTILITIES CO. PUBLIC SERVICE

LOUISIANA GULF COAST

Production in Bayou Sale Area Extended Westward

By T. F. SMILEY

NEW ORLEANS, La.—Production in the Bayou Sale area of St. Mary Parish has been carried farther westward with completion of Texas Co. 2 State-East Cote Blanche Bay. This well, drilled to 10,163 ft., flowed 192 bbl. through 1/8-in. choke, with perforations at 10,122-34 ft. The pay was encountered at 10,107-63 ft.

C. & I. Production Co. was planning to make a dual completion of its Evangeline Parish wildcat, the 1 Samuel Haas estate, in the Pine Prairie district. Three oil sands have been penetrated in this test. The two lower ones are in the Sparta-Wilcox and the third is designated as the Haas. On a 2-hour potential test at the plugged-back depth, 9,054 ft., the well flowed at a daily rate of 149 bbl. through 1/4-in. choke. Tubing pressure was 1,275 lb., casing pressure 1,475 lb., and gas-oil ratio 8,342. Gas volume was estimated at 1,283,000 cu. ft. The operators believe the packer gave way at 8,948 ft. and that this production is coming from perforations at 8,906-18 ft.

The wildcat staked by Humble Oil & Refining Co. in St. James Parish will be the deepest well in that territory if carried to the contract depth, 11,500 ft. The test, 1 Panno & Bossetta, Inc., is a quarter-mile from St. James.

Union Sulphur Co.'s wildcat, 1 J. P. Gueno, in Acadia Parish, which the operators for weeks have been trying to kill, was still flowing. On a 24-hour gage the well flowed 645 bbl. of 51-gravity distillate and 49,000,000 cu. ft. of gas. Pressure on the drill pipe was 200 lb., on the 7-in. casing 230 lb., and on the 10¾ casing 290 lb. The company's 2 Gueno, drilled as a relief well to No. 1 was at 7,883 ft.

Production in the Pine Prairie area of Evangeline Parish was carried southward a little by completion of Pan American Production Co. 3 E. Mansur. It was flowing 194 bbl. through 1/8-in. choke at plugged-back depth of 7,789 ft.

LOUISIANA GULF COAST COMPLETIONS

Fields

Abbeville, Vermilion Parish: Continental 1 Leon de Mary, 17-12s-3e, old T.D. 10,624 ft., cleaned out to 10,355 ft., squeezed old perforations 10,313-26, drilled out to P.B T.D. 10,319 ft., perf. 10,303-13, ft., 27 bbl. distillate and 1,900,000 cu. ft. gas through 5/32-in. choke, T.P. 3,800 lb., C.P. sealed.

(Continued on Page 63)

PERMIAN BASIN, PANHANDLE

Crane County Wildcat Reports Oil Showing in Simpson Sand

By H. F. SIMONS

MIDLAND, Tex.—Gulf Oil Corp. will perforate casing opposite showing of oil in the Simpson sand which was topped at 5,160 ft. in 1-A Dawson, southeast Crane County wildcat which has drilled to 5,505 ft. in Ellenburger, Lower Ordovician, where it found sulfur water. The test has been plugged back to 5,287 ft. where 7-in. casing has been set. Nearest wells producing from the Simpson are in the Abell pool, 12 miles west, and in the Sand Hills pool, 20 miles northwest. Location of 1-A Dawson is in the south corner of the west quarter Section 10, Block 6, H.&T.C. Ry. Co. Survey. Elevation is 2,348 ft.

A new wildcat for Andrews County is DeKalb Agricultural Association 1 A. C. Means estate, SW SW Section 13, Block A-45, Public School Lands, 2 miles northeast of Andrews, and 3 miles south of the Means pool which produces from the Permian lime at about 2,500 ft. Contract depth of the new test is 5,500 ft.

West offset to the Tubb pay discovery in the Monahans pool of northeast Ward County has been staked by Shell Oil as 3 Sealy, SE NW Section 38, Block A, G.&M.M.B.&A. Survey. Humble has staked 2 Parker as a southeast offset to 1 Parker which was officially completed last week for 1,245 bbl., 44.5-gravity oil, in east ¼ of north ¼ Section 6, Block 3, H.&T.C. Survey. Another Ordovician test will be Superior Oil 1 Cordova Union, west part Section 3, Pink Felps Survey, an outpost east of the south part of the Apco-Warner pool.

More water trouble was encountered at Continental Oil 1 Claybrook, Delaware test in western Pecos County, Section 2, Block 50, Township 9, T.&P. Ry. Co. Survey, and another squeeze job was necessary. Bottom of the hole is 5,253 ft. in black lime. Phillips 1 Price, Section 11, Block 101, T.C.R.R. Co. Survey, rank wildcat 27 miles southeast of Fort Stockton, was drilling below 8,170 ft. in shale. Magnolia 1 Robertson, Section 16, Block 142, T.&St. L. Ry. Co. Survey, was drilling ahead past 7,120 ft.

WEST TEXAS COMPLETIONS

Wildcats

Ector County: Roy Lee trustee 1 Josie Fay Peck, SW SW Sec. 2, Blk. 42, T. 4s. elev. 2910 ft., Yates 3,080 ft., Gray lime 4,650 ft., dry, T.D. 4,823 ft. lime.

Fields

Abell, Pecos County: Humble 1 T. R. Parker, N cor. Sec. 6, Blk. 3, H.&T.C.Ry. co. Sur., elev. 2,399 ft., flowed 1,245 bbl., 44.5-gravity, pay 5,371 ft., perf. 120 shots 5,371-91 ft., T.D. 5,410 ft.

Barnhart, Reagan County: Amerada 1-RI University, NW NW Sec. 7, Blk. 48, University Sur., elev. 2,776 ft., flowed 1,342 bbl., perf. 220 shots 9,175-9,230 ft., P.B. 9,231 ft., T.D. 9,287 ft.

Chancellor, Pecos County: Pure Oil 1 Odneal, NW NW Sec. 42, Blk. 49, T. 10s, T. & P. Ry. Co. Sur., elev. 3,280 ft., Del. sand 5,082 ft., dry, T.D. 5,293 ft.

Fullerton, Andrews County: Fullerton Oil 1 McKean & Eilers, SW SW Sec. 14, Blk. A-32, Public School Land Sur., elev. 3,355 ft., flowed 1,676 bbl., pay 6,775 ft., acid 18,000 gal., T.D. 7,260 ft.

McCamey, Upton County: Trebol Oil 1-B Richter, NW SE SE Sec. 6, Blk. R, M. S. Denton Sur., elev. 2,826 ft., pumped 251 bbl., 28,3-gravity, pay 2,355 ft., T.D. 2,411 ft.

Noelke, Crockett County: A. J. Rife 3 Geo. Thompson, NW cor., 120 acres lease, Sec. 58, Blk. GG, Ingham Sur., elev. 2,768 ft., dry, T.D. 2,177 ft., anhydrite.

Slaughter, Cochran County: Devonian 24-A Mallet, SE SE Labor 3, Lge. 55, Oldham County School Land Sur., elev. 3,693 ft., flowed 759 bbl., pay 4,974 ft., acid 12,000 gal., T.D. 5,025 ft. lime.

Magnolia 16-C Mallet, NW cor. Labor 1, Lge. 53, Oldham County School Land Sur., pumped 182 bbl., pay 5,025 ft., acid 10,500 gal., T.D. 5,060 ft., lime.

Slaughter, Hockley County: L. M. Glasco 2-C Mallet, NW NW Labor 24, Lge. 48, Edwards County School Land Sur., flowed 768 bbl., pay 4,915 ft., acid 12,000 gal., T.D. 4,967 ft.

Magnolia 17-D Mallet, NE cor. Labor 9, Lge. 49, Edwards County School Land Sur., elev. 3,582 ft., flowed 887 bbl., 31.2-gravity, pay 4,940 ft., acid 10,500 gal., T.D. 4,995 ft.

Walker, Pecos County: Cardinal Oil 3-E University, NE SW Sec. 13, Blk. 16, University Sur., elev. 2,742 ft., flowed 39 bbl., pay 1,847 ft., T.D. 1,878 ft., lime.

Walker, Pecos County: Childress Royalty 1-C White & Baker, NW NW NE Sec. 89, Blk. 194, G. C. & S. F. Sur., elev. 2,866 ft., S. O. 1,905-12 ft., dry, T.D. 2,136 ft., lime.

Cooper et al 2 Humble-University, SW SE Sec. 13, Blk. 16, University Sur., elev. 3,018 ft., pay 2,113 ft., shot 100 quts. nitro 2,118-38 ft., pumped 93 bbl., T.D. 2,138 ft.

Wasson, Gaines County: Continental 5-52 Wasson, SW SE Sec. 52, Blk. AX, Public School Lands Sur., flowed 1,286 bbl., pay 4,864 ft., acid 6,000 gal., T.D. 4,975 ft.

Mabee O. & G. 2-40 N. W. Willard, NE NW Sec. 40, Blk. AX, Public School Lands Sur., elev. 3,526 ft., flowed 729 bbl., 33-gravity, pay 4,990 ft., acid 12,500 gal., T.D. 5,040 ft., lime.

Wasson, Yoakum County: Belfort Oil 3 J. T. Herd, SE NE Sec. 795, Blk. D, J. H. Gibson Sur., elev. 3,556 ft., flowed 64 bbl., pay 5,015 ft., acid 9,000 gal., T.D. 5,130 ft., lime.

West Fuhrman, Andrews County: Neville G. Penrose 1-B University, SW SE Sec. 14, Blk. 10, University Sur., elev. 3,208 ft., flowed 116 bbl., pay 4,510 ft., shot 245 qts. nitro 4,510-4,620 ft., T.D. 4,630 ft.

White & Baker, Pecos County: Cardinal Oil 2-L White & Baker, SW SW NE Sec. 90, Blk. 194, G. C. & S. F. Sur., flowed 108 bbl., 31.5-gravity, pay 1,913 ft., shot 60 qts. nitro, T.D. 1,928 ft.

PANHANDLE COMPLETIONS

Carson County: Skelly Oil 167 Schafer Ranch, Sec. 197, Blk. 3, I. & G. N. Sur., elev. 3,204 ft., pumped 217 bbl., pay 3,060-3,140 ft., lime and dolomite, T.D. 3,140 ft.

Skelly Oil 163 Schafer Ranch, Sec. 197, Blk. 3, I. & G. N. Sur., elev. 3,208 ft., pumped 63 bbl., pay 3,058-3,140 ft., T.D. 3,140 ft.

Cities Service Oil 10 G. W. Deahl, Sec. 17, Blk. 5, H.&G.N. Sur., elev. 3,377 ft., 51,000,000 cu. ft., pay 2,690 ft., T.D. 2,848 ft.

Stanolind 1 T. E. Griffin, Sec. 9, Blk. 2, A. B. & M. Sur., elev. 3,528 ft., dry, T.D. 5,648 ft.

Gray County: Warner Oil 4 Taylor, Sec. 8, Blk. H, A. W. Wallace Sur., elev. 2,971 ft., 16 bbl., pay 2,882-2,984 ft., T.D. 3,002 ft.

Hutchinson County: J. E. Crosby, Inc. 51 Pitts, Sec. 9, Blk. M-21, T. C. R. R. Co. Sur., elev. 2,816 ft., pumped 173 bbl., pay 2,723 ft., T.D. 2,810 ft.

J. E. Crosbie Inc. 54 Pitts, Sec. 9, Blk. M-21, T. C. R. R. Co. Sur., elev. 2,883 ft., pumped 181 bbl., pay 2,760 ft., T.D. 2,870 ft.

(Continued on Page 66)

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Gas plants in growing numbers are adopting FLORITE as the most economical and satisfactory desiccant. Three reasons, indicated by the chart below, grow more convincing as the tests are continued:

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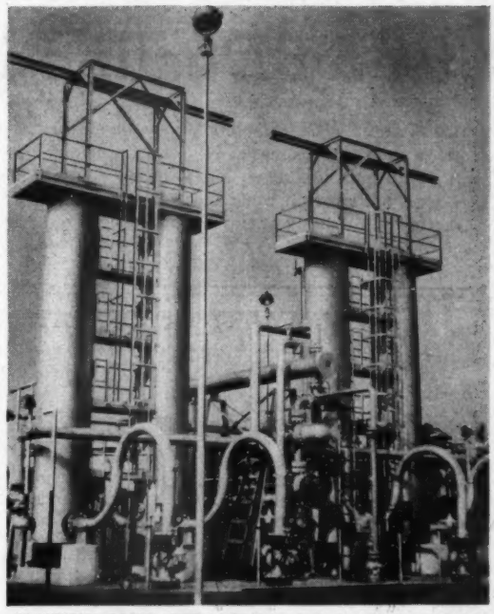

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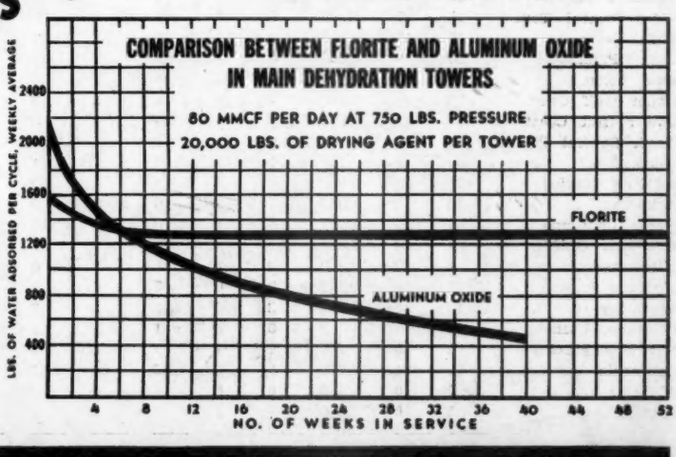
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APPALACHIAN FIELDS

New Oil Pool Indicated in Southwest Pennsylvania

PITTSBURGH, Pa.—In Southwest Pennsylvania a good showing of Fifth sand oil in a test in Perry Township, Greene County, indicates possibilities of a new small pool as it is several miles distant from any oil production. In Lawrence County a deep test passed through the Newburg horizon, which was dry. In West Virginia two wells are being deepened and are drilling in the Salina.

In Slippery Rock Township, Lawrence County, T. W. Phillips Gas & Oil Co. drilled through the Newburg horizon reported at 6,106 ft. in the test on the Delilah Hill farm and it was void of any gas, oil or water. This makes it possible to reach the Clinton as any heavy volume of water would probably have prevented deepening on account of the size of the hole. It is now at 6,190 ft.

On Laurel Ridge in Ligonier Township, Westmoreland County, New Penn Development Co., William E. Snee et al are drilling the test on the John and Eleanor Beck farm at 7,220 ft. and the formation has darkened some which may indicate that the caving section has been cleared.

SOUTHWEST PENNSYLVANIA COMPLETIONS

Clarion County, Porter Township: Piolett Gas Co. 2 W. P. and J. S. Henry, 586,000 cu. ft. gas, Murraysville 845-932 ft., gas 845 ft., Thirty-foot 1,098-1,115 ft., gas 1,105-09 ft., T.D. 1,115 ft.

Red Bank Township: Owens Illinois Glass Co. 1 Abraham Yeaney, 70,000 cu. ft. gas, gas 2,525 ft., R.P. 710 lb., T.D. 2,563 ft.

Greene County, Morgan Township: W. J. Moore et al 2 S. H. Braden, 351,000 cu. ft. gas, Fifth sand 2,798-2,848 ft., gas 2,816 ft., 2,846 ft.

Perry Township: Carnegie Natural Gas Co. 1 F. M. Brock, oil estimated at 15 bbl. a day natural, Fifth sand 3,164 ft., oil 3,198-3,200 ft. Oil rose 2,100 ft. in a 6-in. hole in 10 hr., S.D. to set tankage; well located on Waynesburg topo sheet 4 mi. E of 40° 15′ and 1½ mi. N 39° 45′ and over 3 mi. from any oil production.

Washington County, Chartiers Township: W. S. George Pottery Co. 1 Pittsburgh Coal Co., 45,000 cu. ft. gas, T.D. 2,325 ft.

Westmoreland County, Derry Township: Peoples Natural Gas Co. 1 Jennie M. George, 22,000 cu. ft. gas, Tiona sand 3,048-84 ft., gas 3,079 ft., T.D. 4,351 ft.

WEST VIRGINIA

In Peytona district, Boone County, Owens-Libby-Owens is drilling the 20 Bull Creek Coal & Land Co. deeper after a showing of 103,000 cu. ft. of gas in the Oriskany sand as in a previous test there was a fair showing of gas in both the Newburg and Clinton sand. Here surface elevation is 713 ft., Big lime 999 ft., Injun 1,186 ft., Berea 1,656 ft., Corniferous lime 4,187 ft., Oriskany 4,280-90 ft. with gas showing 103,000 cu. ft. at 4,284-89 ft. It is now drilling at 4,776 ft.

WEST VIRGINIA COMPLETIONS

Calhoun County, Sheridan district: Godfrey L. Cabot, Inc., 1 Ester Bell, 100,000 cu. ft. gas, Squaw sand, T.D. 1,884 ft.

Sherman district: South Penn Natural Gas Co. 11 J. S. Sharp, 12 bbl., Injun sand, T.D. 2,203 ft.

South Penn Natural Gas Co. 13 J. S. Sharp, 18 bbl., Injun sand, T.D. 2,235 ft.

McCall Drilling Co. 1 D. P. Ayers, 33,300 cu. ft. gas, Injun sand, T.D. 2,183 ft.

Clay County, Henry district: Thompson Gas Co. T60 J. A. Sizemore, dry through Injun sand, T.D. 2,234 ft.

Marshall County, Liberty district: Manufacturers Light & Heat Co. 3673 B. I. Rulong, 1,071,000 cu. ft. gas, Big Injun sand, T.D. 2,145 ft.

Ritchie County, Union district: W. H. and L. E. Mossor 1 Walter Newlon, 249,000 cu. ft. gas, Maxton sand 1,735 ft., Big lime 1,825 ft., Injun 1,912 ft., T.D. 1,978 ft.

Roane County, Harper district: American Oil Development Co. 1 Ord Conley, dry, through Big Injun sand, T.D. 2,500 ft.

Smithfield district: South Penn Natural Gas Co. 2 J. W. Epling, 6,500 ft. only gas, Big lime T.D. 1,962 ft.

Raleigh County, Slab Fork district: Godfrey L. Cabot, Inc. 11 Beaver Coal Co., 1,585,000 cu. ft. gas after shot, Big lime, T.D. 2,800 ft.

Upshur County, Meade district: Cumberland & Allegheny Gas Co. 329 O. H. Gaynor, 75,000 cu. ft. gas, Riley sand, T.D. 4,242 ft.

Wayne County, Union district: Owens, Libby-Owens 645 J. P. Barbour, 133,00 cu. ft. gas, elev. 639 ft., Big lime 1,271 ft., Big Injun 1,432 ft., Berea 2,084 ft., brown shale 2,516 ft., Corniferous lime 3,238

(Continued on Page 63)

November Completions Show Steady Decline in Drilling

THE total of 1,353 completions in November is a marked decrease over the previous month, both periods being on a 4-week basis. There were 65 fewer oil wells and 20 less gassers. Active rigs and drilling shows a smaller percentage of decline.

Year-ago completions were 2,794, of which 1,900 were oil wells, 309 gas wells and 585 dry holes. The percentage of decrease in 1942 drilling is growing steadily higher, being 51.6 per cent under November 1941. Oil wells are down 59.7 per cent.

SUMMARY OF OPERATIONS, NOVEMBER 1942

						Completions						
						Under 1,000 ft.	1,000-2,500 ft.	2,500-5,000 ft.	5,000-10,000 ft.	Over 10,000 ft.		
	Comp.	Oil	Prod.	Gas	Dry						Footage	Drlg
Appalachian	278	204	187	52	22	6	229	33	10	0	550,869	208
Ohio	89	13	689	43	33	15	25	47	2	0	218,803	198
Indiana	32	11	637	2	19	3	24	5	0	0	54,510	51
Kentucky	10	1	5	7	2	0	3	7	0	0	28,121	41
Michigan	55	16	1,744	5	34	1	31	23	0	0	128,524	111
Illinois	216	135	17,096	1	80	9	88	119	0	0	530,986	223
Kansas	108	46	31,858	7	55	2	10	96	0	0	353,049	181
Nebraska	2	0	0	0	2	0	1	1	0	0	5,456	15
Missouri, Iowa	0	0	0	0	0	0	0	0	0	0	0	4
Oklahoma	71	32	6,063	7	32	4	15	39	13	0	247,762	225
North Texas	52	23	6,403	0	29	3	20	18	11	0	168,364	112
West Central Texas	18	10	1,588	0	8	0	8	10	0	0	44,818	23
West Texas	55	45	19,110	0	10	1	8	24	22	0	246,640	120
Texas Panhandle	15	9	880	5	1	0	1	14	0	0	46,188	51
East Texas	24	11	3,394	5	8	0	1	10	13	0	42,610	1
Upper Gulf Coast	38	20	3,435	2	16	0	1	3	31	3	253,948	67
Lower Gulf Coast	30	17	2,005	2	11	0	0	3	25	2	200,297	19
South Central Texas	8	1	38	0	7	1	0	2	5	0	40,355	16
South Texas	25	9	759	0	16	0	1	14	10	0	101,375	33
SE New Mexico	15	12	2,900	0	3	1	0	13	1	0	52,476	37
Arkansas	19	10	1,355	1	8	0	3	9	7	0	91,154	36
North Louisiana	44	23	3,751	6	15	0	12	13	19	0	178,063	47
Louisiana Gulf	24	14	3,041	1	9	0	2	1	13	8	192,870	66
Mississippi	2	0	0	0	2	0	0	0	2	0	11,000	3
Montana	13	11	1,827	2	0	2	4	7	0	0	29,236	86
Wyoming	13	8	4,004	2	3	1	2	7	3	0	45,996	73
Colorado, Utah	3	0	0	0	3	1	1	1	0	0	6,752	33
NW New Mexico	2	0	0	1	1	1	1	0	0	0	4,090	19
California	91	84	13,770	1	6	28	28	25	9	1	234,799	120
Alabama	0	0	0	0	0	0	0	0	0	0	0	2
Florida	1	0	0	0	1	0	0	1	0	0	2,640	3
Total November	1,353	765	126,539	152	436	79	519	545	196	14	4,111,751	2,230
Total October	1,451	830	164,850	172	449	71	552	584	223	21	4,638,176	2,242
Difference	98	65	38,311	20	13	8	33	39	27	7	526,425	12

MICHIGAN

Arenac County Test Completed As Small Gas Well

By OTTO C. PRESSPRICH

SAGINAW, Mich.—Field operations in the past week resulted in 10 completions, with 8 of them ending up as dry holes, mostly on wildcat explorations. The only new oil well is a 30-bbl. development in Bangor-Van Buren County. In Adams-Arenac, Don Rayburn plugged back a wildcat oil test drilled to 3,101 ft., without results to get a 500,000 cu. ft. gas well at 1,642. Nearby Ervin Major drilled a dry hole to 3,043 ft.

Four of the completions were in Van Buren County, one being plugged as dry in Bloomingdale Township when an oil show failed to develop after acidizing. A similar result was obtained in a Zeeland-Ottawa test. Drillers temporarily abandoned two wildcat tests in Cass County where M. J. Doblinger stopped a test in Section 32 at 702 ft. and O. B. Constance stopped work on 1 Jewell at 917 ft. in Section 30.

MICHIGAN COMPLETIONS

Allegan County, Valley Township: J. W. Lang, Inc. 1 Johnson, SW NE SW 2-2n-14w, wildcat, dry, T.D. 1,452 ft.

Arenac County, Adams Township: Don Rayburn 1 Mee, C NW NW 4-19n-3e, 500,000 cu. ft. gas, P.B. to 1,642 ft. from 3,101 ft.

Ervin Major 1 Hull, SE NW Sec. 27, dry, T.D. 3,043 ft.

Ionia County, North Plains Township: Freeman Oil Co. 1 Loomis, SW SE 17-8n-5w, wildcat, dry, T.D. 3,006 ft.

Ottawa County, Polkton Township: Muskegon Development Co. 1 Ottawa County, 7n-14w, wildcat, dry, T.D. 1,776 ft.

Zeeland Township: N. R. Dodd 1 Roeloff, SE SW SW 32-5n-14w, wildcat, dry, T.D. 1,505 ft.

Van Buren County, Bangor Township: T. C. Hudson 3 Jackson, NE SE SE 20-2s-16w, pumping 30 bbl. and salt water, T. D. 1,006½ ft.

Bloomingdale Township: Donald E. Fredenhagen 1 Blust, SW NE 15-1s-14w, dry, T.D. 1,287 ft.

Homrich and Kendall 1 Schock, SW NE NW Sec. 15, dry, T. D. 1,300 ft.

Geneva Township: Harris Oil Co. 1 Copenhaver, SW NW NE 33-1s-16w, wildcat, dry, T. D. 1,061 ft.

ILLINOIS FIELD REPORT

New Oil Area Opened North Of Phillipstown Pool

MATTOON, Ill.—The Phillips Petroleum Co. 1 Kuykendall, N½ NE NE 25-4s-10e, last week set 5½-in. casing through oil saturated McClosky lime at 3,075-85 ft. A 1-hour drill-stem test at 3,063-81 ft., showed gas in 13 minutes, recovered 248 ft. of clean oil, 124 ft. of mud-cut oil and 465 ft. of salt water. Operators planned to gun perforate the casing opposite the saturated zone in an effort to shut off the water. The Kuykendall is approximately 1 mile north and slightly east of the Phillipstown pool in White County and may open a new oil area.

West of production in the Armistead pool, Jasper County, Roy Lee trustee 1 J. O. McClure, NW SE 17-6n-10e, had 2,200 ft. of oil in the hole following drilling of plug. The McClosky lime, producing formation in the pool, was encountered at 2,810-20 ft. in the 1 McClure, and the hole is bottomed at 2,825 ft.

An important Devonian test will be made in Marion County by the Adams Oil & Gas Co. The well is the 10-D Pugh, SE 29-4n-1e, located in the heart of the original Patoka pool. The company has derrick built and is rigging up. The Patoka pool to date is without Devonian production, although production from this formation has been found in pools on all sides of the Patoka field. The Boulder field, to the southwest of the Patoka field, the Centralia and Salem fields to the south and the Louden field to the northeast all produce from the Devonian.

ILLINOIS COMPLETIONS

Wildcats

Gallatin County: Kingwood 1 Dodge, NE NW SW 32-8s-10e, dry at 2,959 ft., Aux Vases 2,726 ft., McClosky 2,856 ft.

Hamilton County: Mid-Continent 1 Ruben, NE NE NE 22-3s-6e, dry at 3,508 ft., Aux Vases 3,304 ft., McClosky 3,464 ft.

Oil Carriers 1 Rose, SW NE NE 36-3s-5e, dry at 3,463 ft., Aux Vases 3,229 ft., McClosky 3,358 ft.

Jefferson County: George Echols 1 R. W. Aydt, SW SE SW 1-4s-4e, dry at 3,363 ft., Glen Dean 2,577 ft., Benoist 3,051 ft., Levias 3,171 ft., McClosky 3,283 ft.

Madison County: E. C. Stout et al 1 Gable et al, NE NW NW 7-6n-7w, dry at 2,079 ft., Devonian 1,423 ft., Trenton 2,055 ft.

Montgomery County: W. R. Holmes 1 Nieman, NW SE SW 29-8n-5w, pumped 15 bbl. in 8 hours, T.D. 602 ft.

St. Clair County: Mid-Sun 1 Randle, SW NW 2-1n-8w, dry at 1,977 ft., Bethel 344 ft., Aux Vases 442 ft., Ste. Genevieve 599 ft., Devonian 1,450 ft., Trenton 1,876 ft.

Saline County: Central P. L. 1 Otis Carter, NW NE SE 17-8s-7e, dry at 3,055 ft., Tar Springs 2,226 ft., Cypress 2,604 ft., Benoist 2,781 ft., Ste. Genevieve 2,918 ft.

Washington County: H. Schwartz 2 Leffner, NE SE NW 13-3s-2w, dry at 1,364 ft., Tar Springs 898 ft., Glen Dean 992 ft., Benoist 1,353 ft.

Fields

Allendale, Wabash County: Magnolia 4 Payne, NW NW SW 9-1n-12w, dry at 1,525 ft., sand 1,474 ft.

Magnolia 8 Payne, NE NE SE 8-1n-12w, dry at 1,584 ft.

Magnolia 3 Payne, SE NE SE 8-1n-12w, dry at 1,825 ft., Tar Springs 1,685 ft.

Magnolia 6 Payne, SE NW SW 9-1n-12w, dry at 2,075 ft., sand 1,482 ft.

Bible Grove, Clay County: Texas 1 E. F. Bloemker, SE SE NE 4-5n-7e, pumped 242 bbl., natural, Weller 2,519-32 ft., T.D. 2,534 ft.

Blairsville, Hamilton County: Texas 2 Ernst, E½ SW SW 16-4s-7e, pumped 200 bbl., Aux Vases 3,260-78 ft., 30-qt. shot, reshot 40-qt., T.D. 3,426 ft.

Texas 2 Minton, E½ SW NW 21-4s-7e, pumped 150 bbl., 20-qt. shot, Aux Vases 3,280-3,305 ft., T.D. 3,454 ft.

Bluford, Jefferson County: Lario O. & G. 1 Mountain-Mateer, N½ NW SE 36-2s-4e, pumped 469 bbl., 1,000 gal. acid, reacidized 8,000 gal., McClosky 3,013-16 ft., T.D. 3,028 ft.

Covington, Wayne County: Deep Rock 1 P. Young, NE NE 31-1s-7e, pumped 165 bbl. oil and 38 bbl. water, 3,000 gal. acid, McClosky, 3,207-11 ft., 3,224-25 ft., T. D. 3,225 ft.

Dale, Hamilton County: J. W. Menhall 1 Harrawood, SE SW SE 18-6s-7e, flowed 378 bbl., natural, Aux Vases 3,046-65 ft., T.D. 3,065 ft.

Shell and Payne 5 Rawls, SE SE NW 12-6s-6e, flowed 110 bbl., 20-qt. shot, Aux Vases 3,016-37 ft., T. D. 3,063 ft.

Shell 12 Dailey, NW SW NE 12-6s-6e, flowed 345 bbl., 20-qt. shot, Aux Vases 3,007-43 ft., T. D. 3,055 ft.

East Centerville, White County: Magnolia 2 Jones, NE SE NE 7-4s-10e, pumped 13 bbl., Tar Springs 2,489-2,500 ft., T.D. 2,500 ft.

W. C. McBride 7 Grey, NW SE SE 7-4s-10e, pumped 85 bbl., Tar Springs, 2,443 ft., 60-qt. shot, T.D. 2,499 ft.

Skelly 2-B Barbee, NE NW NE 18-4s-10e, pumped 143 bbl., 30-qt. shot, Aux Vases 3,063-82 ft., 3,082 ft.

East Inman, Gallatin County: Carter 3 Busiek, NW SW SE 11-8s-10e, pumped 194 bbl., 20-qt. shot, Tar Springs 2,034-46 ft., T.D. 2,056 ft.

Griffin, Wabash County: W. W. Grey 37-A Fee, S½ NW SW 14-3s-14w, pumped 25 bbl., shot at 2,775-2,804 ft., Aux Vases 2,776 ft., T.D. 2,804 ft.

Keensburg, Wabash County: Navajo 2 Gray, NW NE SE 30-2s-13w, pumped 100 bbl., Cypress 2,461-68 ft., T.D. 2,468 ft.

Mount Erie, Wayne County: N. Y. Duncan 2 Anderson, NE SW 2-1s-8e, 40-qt. shot 2,988-3,000 ft., Aux Vases 2,988 ft., T.D. 3,145 ft.

New Harmony, White County: Ivan White 4 Lomas, NW NW SW 14-4s-14w, pumped 100 bbl., Tar Springs 2,225-45 ft., 40-qt. shot, T.D. 2,247 ft.

Noble, Richland County: Pure 1 Berger, SE SE SW 26-4n-9e, pumped 41 bbl., natural, Weller 2,577-88 ft., T. D. 2,588 ft.

North Aden, Wayne County: Texas 2 Woodham, NE SW 4-3s-7e, dry at 3,443 ft., Aux Vases 3,218 ft. McClosky 3,346 ft.

North Boos, Jasper County: Pure 2 Swick, SE SW 20-6n-10e, pumped 104 bbl., 5,000 gal. acid, McClosky 2,821-30 ft., 2,833-40 ft., T.D. 2,855 ft.

Phillipstown, White County: Sein 8 H. J. Garner, NW SW NW 6-5s-11e, pumped 65 bbl., Tar Springs 2,278-86 ft., 2,314-22 ft., 30-qt. shot, T.D. 2,333 ft

Rural Hill, Hamilton County: Ohio 1 Dial, NW SW NW 7-6s-6e, pumped 19 bbl., 5-qt. shot 3,198 ft., Aux Vases 3,194-98 ft., 3,202-04 ft., T. D. 3,210 ft.

Magnolia 2 Hamilton, SW NW SE 24-6s-5e, flowed 278 bbl., 22-qt. shot 3,105-27 ft., Aux Vases sand 3,102-10 ft., T.D. 3,127 ft.

South Lawrence, Lawrence County: E. O. Olds 6 Van Wey, NW NE SE 23-2n-12w, pumped 200 bbl., natural, Biehl 1,342-71 ft., T.D. 1,371 ft.

S. W. Mitchell 1 Stevens, NW NE NW 25-2n-12w, dry at 1,427 ft.

Stokes, White County: Pure and Carter 2 Gowdy, SE SW SE 7-6s-9e, pumped 117 bbl., 35-qt. shot 3,812-27 ft., T.D. 3,827 ft.

Walpole, Hamilton County: Perrine & Pearson 1 Lee, SW NE NW 27-6s-6e, dry at 3,098 ft.

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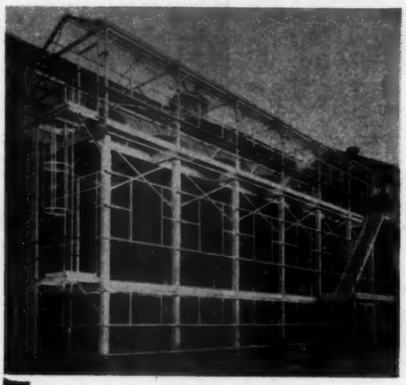

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CALIFORNIA FIELD REPORT

Initial Gage at Turnbull Canyon Test Proves Disappointing

By L. P. STOCKMAN

LOS ANGELES, Calif.—Continental Oil Co. completed 4 Turnbull Canyon in the Turnbull Canyon field of Los Angeles Basin this week, but instead of getting a large flowing well initial daily production was only 380 bbl. of 26.4-gravity oil and 225,000 cu. ft. of gas. The company opened up the well a few days later and it died, thus indicating that the hole is full of mud and undoubtedly could not produce at its maximum rate. The company is going back into the hole and wash out all mud present and at the same time clean out perforations. The most significant thing in connection with the completion of 4 Turnbull Canyon, which is located on a community lease, is the fact that it has a total of 546 ft. of perforations open to production. This means that either the well has found a substantial thickness of oil sand or that there is a duplication of zones due to faulting. In either case the well can be expected to register large production when it is returned to the producing stage or it will register smaller production and show a very long life. It is not often that in excess of 500 ft. of productive formation is found in a well that only shows small production and then dies. The fact that production was cutting from 2 per cent to 75 per cent during the short flow test indicates the well was producing under a severe handicap especially when most of the cut consisted of heavy drilling mud. It is thought quite likely that Continental will be able to finish a relatively large flowing well upon completion of the clean-out job now under way.

LOS ANGELES COMPLETIONS

Buena Park, Orange County: Texas Co. 4-1-F Buena Park, 36-3s-11w, abandoned in gray sand, T.D. 9,572 ft., failed to find enough oil sand in Buena Park zone to justify production test.

Potrero, Los Angeles County: Tide Water Associated Oil Co. 1 Cypress, 34-2s-11w, recompleted flowing 94 bbl. net, 43.3-gravity, 20 per cent cut, 920,000 cu. ft. natural gas, 39/64-in. bean, pressures 20/200 lb., T.D. 5,580 ft., P.B. 5,039 ft., gun perf. 4,935-50 ft., plugged and reperforated.

Turnbull Canyon, Los Angeles County: Continental Oil Co. 4 Turnbull Community, 13-2s-11w, flowed 380 bbl., 26.4-gravity, 2 per cent cut to 50 per cent cut, consisting mostly of mud, 225,000 cu. ft. gas, 31/64-in. bean, pressures 300/500 lb., T.D. 4,068 ft., liner record: 65 ft. perf., 20 ft. blank pipe, 105 ft. perf., 30 ft. blank pipe, 60 ft. perf., 50 ft. blank, 100 ft. perf., 40 ft. blank, 46 ft. perf., 59 ft. blank, 15 ft. perf., 20 ft. blank, 155 ft. perf. and 25 ft. blank pipe, completed in Turnbull Canyon zone of Miocene age, initial production does not represent potential as mud cutting off production, large amount of zone may be new zone or duplication of original zone due to faulting.

San Joaquin Valley

Standard Oil Co. reports that all of its holdings in Naval Reserve No. 1 have passed to the Navy Department and will in the future be operated by Standard on a cost basis for Navy. Present plans, as announced by the Navy Department, indicate the field will be produced for another 5 years at not to exceed 15,000 bbl. per day. Current production has been averaging slightly more than 13,000 bbl. daily. The Navy Department feels that certain sections of the field have been overproduced and have created an area of low pressure or sink that is draining oil and gas from areas of higher pressure. To correct this condition, it is thought quite probable that the Department will acquire all acreage on the Elk Hills struction at the earliest possible moment either through cancelation of existing leases or by purchase of lease and facilities. On the Navy Department's announcement and on the basis of 15,000 blb. per day, Standard will receive approximately 9,125,000 bbl. of crude oil during the proposed 5-year period and the Navy Department will receive 18,250,000 bbl. of crude oil. Under single ownership and operation it will be possible to greatly increase the field's ultimate production through repressuring and injection of gas from the Stevens zone of Miocene age into upper Pliocene zones as well as use of any gas remaining in the Elk Hills gas sand.

Wilshire Oil Co. has completed another new well in the Jacalitos field of Fresno County which the company discovered early this year and as a consequence has increased the field's ultimate recovery by extending the productive limits. The Temblor sand from which Wilshire-Annex is producing is quite thin but has sufficient kick to produce commercially with the result that all completions to date, with one exception, came in under a natural flow. This field, pronounced Hackaleetus, was prospected for a number of years before Wilshire-Annex Oil Co. made the discovery although many prior prospectors had logged showings of oil and gas. Wilshire-Annex Oil Co. drilled entirely through the Temblor formation in the Jacalitos field but did not find anything down to or in the top of the Cretaceous so the present zone may possibly be the only horizon that will produce commercially. After finding the lower part of the original hole barren Wilshire-Annex Oil Co. landed a string of casing and then gun-perforated opposite the Tembler oil sand that had been cored on the way down. The result was discovery of a new oil field and while only normal development has been undertaken to date, prospects point to the existence of a commercial accumulation. Development work to date has been on the basis of one well to each 40 acres which is good spacing in this field because of relatively thin oil zone. The Temblor is reached at a comparatively shallow depth and for this reason drilling costs are low and it does not require as much oil as other deep fields to pay out development costs.

SAN JOAQUIN VALLEY COMPLETIONS

Antelope Plains, Kern County: Shell Oil Co. 33-6 Williams, 6-8s-20e, flowed 309 bbl., 16.5-gravity, 0.3 per cent cut, T.D. 2,315 ft., perf. 2,210-76 ft., 2,251-95 ft., completed in Williams zone of Miocene age.

Belridge, South, Kern County: Belridge Oil Co., 26-33 fee, 33-28s-21e, pumped 35 bbl., 14.5-gravity, 10 per cent cut, T.D. 750 ft., 60-mesh perf. 409-750 ft., completed in upper zone of Pliocene age.

Belridge Oil Co. 36-33 fee, 33-28s-21e, pumped 28 bbl., 14.4-gravity, 7 per cent cut, T.D. 750 ft., perf. 448-750 ft., completed in upper Belridge zone of Pliocene age.

General Petroleum Corp. 22-3 fee, 3-29s-21e, pumped 60 bbl., 15.8-gravity, 20 per cent cut, T.D. 1,010 ft., perf. 584-816 ft., 859-990 ft., completed in upper zone of Pliocene age.

Coalinga, East, Fresno County: Shell Oil Co., Inc. 158-15 fee, 15-19s-15e, pumped 60 bbl., 26.9-gravity, 2.5 per cent cut, T.D. 1,634 ft., P.B. 1,580 ft., perf. 1,380-1,580 ft., completed in upper zone of Pliocene age.

Shell Oil Co. 172-32 fee, 32-19s-15e, pumped 285 bbl., 25.9-gravity, 4.2 per cent cut, T.D. 2,928 ft., perf. 2,809-59 ft., 2,899-2,927 ft., completed in upper zone of Pliocene age.

Shell Oil Co. 105-36 fee, 36-19s-15e, pumped 37 bbl., 23-gravity, 3 per cent cut, T.D. 3,905 ft., P.B. 3,640 ft., perf. 3,540-3,640 ft., completed in upper zone of Miocene age.

Standard Oil Co. 104-35-A fee, 35-19s-15e, pumped 108 bbl., 20.5-gravity, 7 bbl. of water, T.D. 3,117 ft., P.B. 2,980 ft., perf. 2,865-2,975 ft., completed in Coalinga zone of Miocene age.

Fruitvale, Kern County: Western Gulf Oil Co. 42-B Kern County Land, 14-29s-28e, pumped 15 bbl. net, 19.5-gravity, 30 per cent cut, T.D. 3,457 ft., P.B. 3,070 ft., completed in Martin sand of Pliocene age.

Jacalitos, Fresno County: Wilshire-Annex Oil Co. 47-26-E, 26-21s-15e, flowed 52 bbl., 40.1-gravity, 0.1 per cent cut, 33/64-in. bottom-hole bean, flow pressure 60 lb., T.D. 3,887 ft., perf. 3,859-87 ft., completed in Temblor zone of Miocene age.

Kern River Front, Kern County: General Petroleum Corp., 47 Young, 14-28s-27e, pumped 57 bbl., 14.3-gravity, 57 per cent cut, T.D. 2,002 ft., perf. 1,667-2,001 ft., completed in Kern Front zone of Pliocene age.

Standard Oil Co. 9-7 fee, 9-28s-27e, pumped 151 bbl., 14-gravity, and 36 bbl. of water, T.D. 2,840 ft., perf. 2,680-2,840 ft., completed in Kern Front zone of Pliocene age.

Kettleman North Dome, Kings County: Standard Oil Co., 63-13-P fee, 13-22s-17e, flowed 381 bbl., 32.2-gravity, 1 per cent cut, 197,000 cu. ft. gas, 30/60-in. bean, T.D. 8,755 ft., P.B. 8,735 ft., completed in lower Temblor zone of Miocene age.

Midway-Sunset, Kern County: Chansior-Canfield Midway Oil Co., 42-9 fee, 9-32s-23e, pumped 52 bbl. net, 19.6-gravity, 35 per cent cut, T.D. 3,509 ft., perf. 3,220-3,509 ft., completed in second zone of Pliocene age.

Richfield Oil Corp., 12-A Southwestern, 2-31s-22e, pumped 64 bbl., 14-gravity oil and 36 bbl. of water, T.D. 1,300 ft., perf. 1,045-1,300 ft., completed in upper zone of Pliocene age.

Standard Oil Co. 7-35-B fee, 35-31s-23e, pumped 20 bbl., 28.2-gravity, 0.2 per cent cut, T.D. 3,490 ft., perf. 3,423-90 ft., completed in second zone, Pliocene age.

Standard Oil Co. 76-35-B fee, 35-31s-23e, pumped 40 bbl., 19.9-gravity, 17 bbl. of water, T.D. 3,415 ft., perf. 3,130-3,413 ft., completed in Midway zone of Pliocene age.

Standard Oil Co., 107-27-B fee, 27-31s-23e, pumped 20 bbl., 28.9-gravity, 2 per cent cut, T.D. 3,291 ft., perf. 2,892-3,285 ft., completed in Calitroleum zone of Pliocene age.

Mountain View wildcat district, Kern County: Di Giorgio Fruit Co. 1 South Mountain View, 12-31s-29e, abandoned in granite 2,080-2,271 ft., logged gray sand and little oil sand in Kern River series of Pliocene age but no oil or gas below base of this formation.

Mount Poso, Kern County: Union Oil Co. 36 Sarrett and Mack, 4-27s-28e, pumped 75 bbl. net, 15.1-gravity oil, 81 per cent cut, T.D. 2,016 ft., perf. 1,946-2,016 ft., completed in Vedder sand of Miocene age.

Riverdale, Fresno County: Amerada Petroleum Corp., 33-2-F Lawton, 26-17s-19e, flowed 21 bbl., 52.6-gravity, 0.1 per cent cut, 1,017,000 cu. ft. gas, 11/64-in. bean, pressures 2,300/2,450 lb., T.D. 6,900 ft., perf. 6,620-30 ft., 6,755-75 ft., completed in Lawton zone of Miocene age.

Round Mountain, Kern County: D. G. Vedder, 13 Bell, 12-28s-28e, abandoned in barren gray Vedder zone of Miocene age, T.D. 2,132 ft., drilled on wrong side of Round Mountain fault.

COASTAL DISTRICT

Tide Water Associated's 1 Sesnon, in the extreme western end of the Aliso Canyon field of Los Angeles County, has established a potential daily production of 2,880 bbl. and 1,100,000 cu. ft. of gas on an actual flow test. This well, a recent completion in the lower zone, is a joint test with Standard Oil Co. and its completion proves up the deep sesnon zone as highly productive. In the upper zone, this well was completed as a gasser as it only made a few barrels of crude oil along with a considerable amount of natural gas. In the Del Valle field, R. E. Havenstrite has started final preparations which will result in the making of a production test on his 2 Barnes, which has a promising oil sand at 9,735-9,870 ft. This sand looks very good and there is every reason to expect a good flowing well barring of course any water trouble. In addition to this new deep zone which has not yet been tested, Havenstrite has uncovered two other zones higher up in the hole that might ultimately be found highly productive. One of these horizons on a formation test showed up exceptionally good and may be produced in subsequent wells. This deep zone, which may be the equivalent of the Sesnon zone of Miocene age in the Aliso Canyon field and the lower Leckler zone of Western Gulf Oil Co. in the Oak Canyon field, is expected to prove of considerable importance in future production.

COASTAL DISTRICT COMPLETIONS

Fillmore wildcat district, Ventura County: J. J. Stevens, 1 Fillmore, 31-4n-20w, abandoned without making production test, T. D. 1,102 ft., will be considered as structure survey hole.

Gato Ridge, Santa Barbara County: Barnsdall Oil Co., 4 Tognazzini, 4-8n-32w, pumped 460 bbl., 12.9-gravity, 2.6 per cent cut, T. D. 3,720 ft., perf. 2,660-3,720 ft., completed in Gato Ridge sand of Miocene age.

Gato Ridge wildcat district, Santa Barbara County: General Petroleum Corp., 1 Giorgi, 13-8n-32w, abandoned in basalt 975-1,255 ft., no showings of any importance, will drill second test in this area.

San Miguelito, Ventura County: Continental Oil Co., 28 Grubb, 24-3n-24w, flowed 1,175 bbl., 31.2-gravity, 0.5 per cent cut, 1,326,000 cu. ft. gas, 112/64-in. bean, pressures 600/800 lb., T. D. 7,385 ft., perf. at intervals 6,385-7,384 ft., completed in Grubb zone of Pliocene age.

Santa Maria, Santa Barbara County: Standard Oil Co., 1 Rice Ranch, 14-9n-34w, abandoned in gray sand, T. D. 9,254 ft., no showings worth testing were logged from top to bottom.

Santa Maria Wildcat district, Santa Barbara County: Universal Consolidated Oil Co., 1 Careaga, 5-8n-33w, abandoned in gray sand, T. D. 6,123 ft., form. test 5,150-320 ft., recovered 4 stands mud showing no oil or gas.

Santa Maria Valley, Santa Barbara County: Union Oil Co., 5 Mahoney, 24-10n-34w, flowed 567 bbl., 15.9-gravity, 3 per cent cut, 32/64-in. bean, pressures 230/1,160 lb., T. D. 3,673 ft., perf. 2,972-3,672 ft., completed in Monterey of Miomene age.

NORTH CENTRAL TEXAS

Scotland Pool in Archer County Extended by Large Flowing Well

By H. F. SIMONS

WICHITA FALLS, Tex.—The Scotland pool in Archer County was extended by the Shell Oil 6 W. M. Coleman C, H. S. Smith Survey A-396 flowed 111 bbl. in 3 hours, shut in for 3 hours, flowed 107 bb. in 4 hours through open 2-in. tubing, total depth 6,083 ft. Four miles north of Scotland, Whitaker Oil 1 W. M. Coleman, promising Strawn sand pool opener in Section 25, Coleman subdivision, shot sand from 3,696-3,720 ft., collapsed casing, and shut down.

In Clay County, Youngblood & Foree 1 Sanzenbacher, 3 miles southwest of Henrietta, pulled tubing to perforate casing around 5,330-38 ft. after swabbing only 11 bbl. in 12 hours.

There were 20 new locations for the North Texas district during the past week, 2 of which were wildcats. The Gibtown area of southeast Jack County was favored by location for a 6,000-ft. test to the Ellenburger at Paul H. Gunther 1 Mrs. Edith Browning Bailey, 2,235 ft. from west line, 4,083 ft. from north line of George H. Duncan Survey, A-175, or 660 ft. from south and west lines of the 150-acre tract. The location is ½ mile east of Gibtown. The other wildcat is in Montague County, 7 miles north of St. Jo, where Rogers Brothers Drilling Co. will drill 1 Ellen Hoffman 660 ft. from south and east lines of the Thomas Puckett Survey, A-607 to a depth of 3,500 ft.

Roy Lee, trustee, 1 C. T. Maddox, northeast Clay County, topped Caddo lime at 5,368 ft., oil showing in lime from 5,485 ft. to 5,501 ft., had tight lime 5,501-07 ft., and is drilling ahead below 5,530 ft. Promising shows were had in the Shell 1 Maddox, to which this well is an offset, but tools were lost in the hole and it was junked. The well is located in the T. M. Hughes Survey, A-179, 8 miles northwest of Ringgold.

In Jack County, 8 miles southeast of Jacksboro, Hanlon-Buchanan 1 Dorcas Hensley, B. F. Terry Survey, drilled oil-stained sand from 4,520-27 ft., and a core from 4,527-36 ft. recovered 3 ft. sand and sandy shale with stain, and is drilling ahead. Top of Strawn sand was called 3,940 ft. Same operators have started operations at 1 Kinder, E. Pearce Survey, 6,500-ft. test for which location was announced several weeks ago.

WEST CENTRAL TEXAS COMPLETIONS

Wildcats

Callahan County: A. S. Goodloe 1 G. T. Brashear, blk. 6, Lavaca County School Land Sur., dry, T.D. 824 ft.

Comanche County: O. L. Johnson 1 Hutchinson, T. Hutchinson Sur., dry, T. D. 2,715 ft.

Jones County: G. E. Kadane & Sons 1 O. W. Wylie, Sec. 2, Blk. 15, T. & P. Ry. Sur., dry, T.D. 2,212 ft.

Stephens County: Daniel Prod. 2 Mary Pratt, SE NW Sec. 1294, T. E. & L. Sur., Caddo lime 3,300 ft., dry, T.D. 3,309 ft., lime.

Fields

Avoca, Jones County: Phillips 3 A. E. Olson, NE NE Sec. 189, B. B. B. & C. Sur., elev. 1,503 ft., flowed 499 bbl., pay 3,213 ft., Palo Pinto lime, T.D. 3,223 ft.

Akard, Jones County: Tex-Pac Coal & Oil Co. 1 C. H. Stokes, SE Sec. 137, G. Martinez Sur., elev. 1,679 ft., flowed 219 bbl., pay 2,124 ft., Flippen sand, T.D. 2,136 ft.

Coker, Coleman County: Anderson-Prichard 2 Coker, Sec. 72, Blk. 2, G.H.&H. Sur., flowed 250 bbl., Morris sand, T.D. 3,046 ft.

Crownover, Brown County: Guyle Williams 1 A. Waldrep, Sec. 26, B. B. B. & C. Sur., dry, T.D. 1,252 ft.

Morris, Coleman County: Anzac and Semmes 4 Morris, Sec. 74, H. T. & B. Sur., flowed 156 bbl., pay 2,195-2,206 ft., T.D. 2,211 ft.

NORTH CENTRAL TEXAS COMPLETIONS

Wildcats

Clay County: Continental Oil 6 Earl Spring, Sec. 25, Marion Co. Sch. Land Sur., dry, T.D. 6,262 ft.

Wilbarger County: W. T. Waggoner Est. 1 Waggoner "JJ," J. S. Calhoun Sur. A-945, dry, 4,614 ft.

Fields

Davenport, Montague County: Rogers Bros. Drlg Co. 1 J. F. Schenk, S. Dunham Sur. A-196, dry, T.D. 3,479 ft.

Markley, Young County: Phillips Pet. 19-A Pan C. W. Johnson, Lot 14, E. W. Sargeant Sur. A-253, pumped 5 bbl., pay 581 ft., T.D. 585 ft.

Ragland, Young County: L. T. Burns 2 Morrison, Blk. 246, T.E.&L. Sur., flowed 612 bbl., pay 4,854 ft., T.D. 4,881 ft., lime.

Rock Crossing, Wilbarger County: Phillips Pet. 9 W. T. Waggoner Est. "OO," Sec. 45, Blk. 4, H.& T.C. Ry. Co. Sur., 50 bbl., pay 1,874 ft., T.D. 1,900 ft.

Scotland, Archer County: Shell Oil 5-C Coleman, Lot 2, Blk. 74, A.T.N.C.L. Sur., flowed 1,500 bbl., pay 5,152-90 ft., perf. 40 shots, acid 1,000 gal., P.B. 5,383 ft., T.D. 5,570 ft., lime.

Swastika, Archer County: Producers Dev. Co. 11 G. H. Roach, Sec. 1595, T.E.&L. Sur., gas input well, T.D. 1,274 ft.

Thornberry, Clay County: J. C. Barnard 1 J. B. L. Hansard, Lot 1, F. Longoria Sur. A-286, 10 bbl., pay 1,125 ft., T.D. 1,141 ft.

Metzner & Gorman 1 Taylor & Riley, Jane Duncan Sur. A-112, dry, T.D. 1,180 ft.

Metzner & Gorman 2 Taylor & Riley, Jane Duncan Sur. A-112, dry, T.D. 1,325 ft.

Throckmorton County: Humble Oil & Ref. Co. 5 J. N. McKnight, NW NW Day Land & Cattle Co. Sur., dry, T.D. 4,068 ft., lime.

EASTERN TEXAS FIELDS

Many New Wildcats Under Way In East Texas Area

DALLAS, Tex.—Six new wildcat tests were either staked or started during the past week in the East Texas area. In Angelina County, 3 miles south of Ivy, K. L. McHenry et al have staked their 1 Long Bell Lumber Co., 5,280 ft. from the northwest and 800 ft. from the southwest lines of the P. Mullins Survey. The test is contracted to 5,000 ft. In Dallas County, near the Ellis County line, Capt. J. F. Lucey and S. A. Guiberson, Jr., will drill a Smackover lime test 1,980 ft. from the southwest line and 660 ft. from the northwest line of the D. H. Meyer 198.3-acre tract in the Thomas Johnson Survey, 4 miles northeast of Ferris.

Van Zandt County gets a new operation at Oscar Donley 1 Clark, center 40-acre tract in the J. A. Parker Survey, to go to the Woodbine. East of Kemp, southeast Kaufman County, Elbert Williams will drill 1 Hood Berryman, a Woodbine sand test in the NW corner of the farm in the E. Higdon Survey. Iowa Payne Oil Co. 1 A. Murray, Thomas Quevedo Survey, 5 miles southeast of Chandler, has derrick erected for a Woodbine sand test, and in Upshur County, north of Gladewater, Blackwell Oil & Gas Co. 1 M. B. Briggs, NW corner Lot 55, Davenport Survey, is drilling and coring below 3,737 ft. since starting December 6.

Schlumberger has been run, and all porous zones will be tested in the deep Nacogdoches County wildcat of Texas Co. 1 Strahan, 7 miles NE of Nacogdoches. The test has reached 9,259 ft. with several oil and gas shows. Bowie County's deep test, P. D. Bowlen 1 Simms, is drilling around 8,500 ft. in an undetermined formation, probably Buchner lime. Magnolia 1 McCreight, northwest of the new Paluxy pool discovered by Delta Drilling Co., cored water sand in the Paluxy and is drilling ahead toward the 9,000-ft. contract depth.

Outlet for the oil from the new Quitman pool for the present will be by trucked to Winnsboro, where Gulf Refining Co. has a pump station and will take it in its line at that point. Shell Oil has staked location for the second well in the pool. 1 J. R. Blalock, 663 ft. from the south line and 660 ft. from east line of 67.76-acre tract, S. G. Purse Survey, a north offset to the discovery.

EASTERN TEXAS COMPLETIONS

Wildcats

Van Zandt County: O. W. William 1 G. A. Wages, D. Chessher Sur., elev. 2,323 ft., Woodine 4,180 ft., Georgetown 4,930 ft., dry, T. D. 4,955 ft., shale and lime.

Fields

Hawkins, Wood County: Humble Oil & Ref. 2 G. W. Atkins, H. E. Watson Sur., elev. 415 ft., flowed 616 bbl., pay 4,704-12 and 4,802-07 ft., T.D. 4,865 ft.

Paul Miller et al 1 P. L. Faulk, Geo. Brewer Sur., elev. 397 ft., flowed 469 bbl., pay 4,602-12 and 4,646-52 ft., T.D. 4,820 ft.

ROCKY MOUNTAIN AREA

Oil and Gas Showings Reported In Colorado Wildcat

By T. R. INGRAM

DENVER, Colo.—The Ramsey Petroleum Corp. 1 Graham, SW SW 14-7n-59w, Weld County, northeastern Colorado, has reached a critical depth and results of this important wildcat will be known within a few days. It was coring at last reports in the Muddy sand and showing some oil and gas. It did not stop to test but is continuing on to the Dakota. The well is reported running a little higher than 1 Tighe, one-third of a mile to the northwest which was drilled in 1932 and showed for 6,000,000 cu. ft. of gas in the Muddy sand at 6,672-92 ft. and had some oil in the top of the Dakota followed by water. While it is too early to make any definite predictions as to the outcome, the prospects are considered very encouraging.

MONTANA COMPLETIONS

Cut Bank, Glacier County: Steele Creek Oil Co. 5 Carmen SE NW NE 19-34n-5w, T.D. 2,723 ft., 5-in. 2,680 ft., Sunburst 2,670-72 ft., upper Cut Bank 2,702-33 ft., completed as a gas well for 5,000,000 cu. ft. open flow.

Kevin-Sunburst, Toole County: Henry Vanderpas 8 fee, NE NW NE 6-34n-1w, T.D. 1,428 ft., contact 1,427 ft., averaged 10 bbl. per day on 10-day test after acid, 1,000 gal.

Texas Co. 15 Bruibs, NW NE SE 9-35n-2w, T.D. 1,625 ft., contact 1,622 ft., acid, 1,000 gal., 20 bbl. per day initial.

Louisiana Gulf Coast

(Continued from Page 58)

Bayou Couba, St. Charles Parish: Gulf 2 Delta Securities Co., 13-15s-21e, dry at 6,449 ft., P.B. 6,236 ft.

Bayou Sale, St. Mary Parish: Texas 2 State East Cote Blanche Bay, Bay-16s-9e, perf. 10,122-34 ft., 192 bbl. through 1/8-in. choke, T.P. 1,750 lb., C.P. sealed, gas-oil ratio 1,250 T.D. 10,623 ft.

Grand Bay, Plaquemines Parish: Gulf 17 State QQ, 5-20s-19e, perf. 8,536-48 ft., 357 bbl. through 5/32-in. choke, T.P. 1,375 lb., C.P. sealed, gas-oil ratio 770, T.D. 10,040 ft.

Lake de Cade, Terrebonne Parish: Superior Oil Co. 2 La Terre Co., Inc., 28-19s-15e, dry at 13,075 ft. Superior Oil Co. 484 State Lease, La Terre Unit Well 1, 27-19s-15e, location abandoned.

Lake Salvador, St. Charles Parish: Texas 19 State-Lake Salvador, Lake-16s-22e, perf. 9,556-68 ft., 196 bbl. through 1/8-in. choke, T.P. 1,325 lb., C.P. sealed, gas-oil ratio 407, T.D. 10,254 ft.

Lockport, Calcasieu Parish: Magnolia Farquhar Unit Well 1, 8-10s-9w, perf. 6,526-30 ft., 215 bbl. and 374,000 cu. ft. gas through 10/64-in. choke, T. D. 8,178 ft., P. B. 6,540 ft.

Pine Prairie, Evangeline Parish: Pan American 3 E. Mansur, 2-4s-1w, perf. 7,745-60 ft., 194 bbl. through 1/8-in. choke, T.P. 1,250 lb., C.P. sealed, gas-oil ratio 850, T.D. 7,882 ft., P.B. 7,789 ft.

Roanoke, Jefferson Davis Parish: Humble 5 M. Kratzer, 11-9s-4w, O.W.W.O., old T.D. 8,694 ft., perf. 8,690-92 ft., set 2½-in. tbg. at 8,482 ft., 55 bbl. on pump.

South Roanoke, Jefferson Parish: Continental 1 Calcasieu National Bank, 36-10s-4w, O.W.W.O., old T. D. 9,985 ft., cleaned to 9,983 ft., squeezed old perf., drilled out to P.B. T.D. 9,962 ft., perf. 9,953 ft., dry and abandoned.

Tepetate, Acadia Parish: Continental 8-A L. L. Welch, 28-7s-2w, old T.D. 8,306 ft., killed well and cleaned to 8,300 ft., P.B. 8,294 ft., perf. 8,290-93 ft., 69 bbl. through 9/64-in. choke, T.P. 1,350 lb., C.P. 1,450 lb.

Appalachian Fields

(Continued from Page 60)

ft., Big Six 3,970-92 ft., gas from Big Six, T.D. 4,040 ft.

ORISKANY SAND FIELDS

Jackson County, Ripley district: West Virginia Gas Corp. 1 Orpha R. Castro, 5,166,000 cu. ft. gas before shot, Corniferous lime 5,166 ft. and drilled through Oriskany to T.D. 5,275 ft.

West Virginia Gas Corp. 1 R. G. S. Cunningham, 3,170,000 cu. ft. gas before shot, Big lime 1,982 ft., Berea 2,443 ft., Corniferous lime 5,036 ft., Oriskany 5,131 ft., gas 5,129-41 ft., T.D. 5,164 ft.

West Virginia Gas Corp. 1 E. E. Simmons, 2,659,000 cu. ft. gas before shot, Big lime 2,015 ft., Berea 2,600 ft., Corniferous lime 5,119 ft., Oriskany 5,218 ft., T.D. 5,240 ft.

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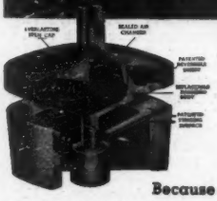

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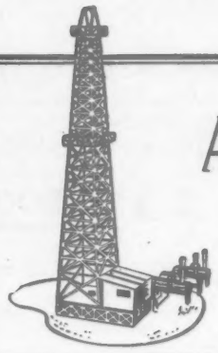

Among the Drilling

WISE Drilling Co. of Okmulgee, Okla., has staked the 1-A Fields in approximately center of west line of W½ NW 28-13n-11e, Okmulgee County, Oklahoma.

ALLIED Well Service, Inc., Houston, Tex., has started a workover on a well of Three Bee Investment Corp., in the Dickinson field, Galveston County, Texas. It has just finished a similar job on 10 Hargraves, in the Katy field of Southeastern Waller County, Texas, for Stanolind Oil & Gas Co.

BREWSTER-BARTLE Drilling Co., Houston, Tex., has the contract for Adams Oil & Gas Co., 1 Pieper, a semiwildcat in DeWitt County, Texas, projected for 9,150 ft. It started work on Skelly Oil Co. 1 Steves, a wildcat in the South Louise area of Wharton County, Texas, to go to 7,500 ft. It is redrilling A-16 Settegast for Rio Bravo Oil Co., at Pierce Junction, in Harris County, Texas. The company recently completed three contracts in Texas: Ohio Oil Co. 2 Account 2 in the North Bay City field, Matagorda County; Broderick & Gordon 1-A Lobits, near Addicks, Harris County, and Navarro Oil Co. 1 McKee Unit, in the Mauritz field of Jackson County.

O. A. KEMNITZ has the drilling contract on Westoak Gasoline Co. 1 Brown, in SE SE NW 36-10n-21w, south of Elk City, Beckham County, Oklahoma, which was due to spud in last week end.

HOUSTON Drilling Corp., Houston, Tex., was making casing perforations late last week preparatory to completing Mauritz B-1 for Gulfboard Oil Corp., in the West Mauritz field, near Ganado, Jackson County, Texas. The same contractor recently completed Mauritz A-1 in that field for Gulfboard.

BOBBY MANZIEL, of Tyler, Tex., has drilling contract on the test Oscar Donley of Fort Worth, Tex., has staked on a 40-acre tract in the J. A. Parker Survey, north and east of Ben Wheeler community, Van Zandt County, Texas. The test is to seek the Woodbine or go to 4,000 ft. It is the 1 Clark.

C. I. Drilling Corp., Houston, Tex., has completed 1 Samuel Haas estate, a semiwildcat on the Pine Prairie dome, Evangeline Parish, Louisiana. This well was for C. & I. Production Co., Inc., and Kirby Petroleum Co. The same contractor is around 8,900 ft. on a test for William Helis 1 Armelise Planting Co. in the Napoleonville area of Assumption Parish, Louisiana.

BUTLER & HORNE Drilling Co. has announced two new locations for the Reddin pool in northern Taylor County, Texas. The 2 Reddin is 1,000 ft. east of the 1 Reddin, and the 4 Hudson is 1,000 ft. south and east of the 2 Hudson.

LON H. CRON, Houston, Tex., has two rigs running for Continental Oil Co., one on B-13 Robert Driscoll, in the Driscoll field, Duval County, Texas, and the other on 1 O. F. Allenson, a wildcat 13 miles northwest of El Campo, in Wharton County, Texas.

RHODES Drilling Co., Abilene, Tex., has moved rig from Anderson-Prichard Oil Corp. 1 Sealy-Smith Foundation, Section 121, Block 2, G.H.&H. Survey, new pool opener in southwest Callahan County, Texas, to 2 Sealy-Smith, south offset to the discovery.

GRAY & WOLFE, Houston, Tex., have rigged up on a wildcat test in southeast Dallas County, Texas, the J. F. Lucey and S. A. Guiberson, Jr., 1 L. W. Allen, in the Thomas Johnson Survey. Contract depth is 6,500 ft., and the well will test the Smackover lime.

CROSS Drilling Co., Odessa, Tex., is drilling in the Mascho-University pool of Andrews County, Texas, for the account of Belfort Oil Co.

OSAGE Drilling Co. has contract to drill Belfort Oil Co. 1-C University, Section 14, Block 9, University Survey, Macho-University pool, Andrews County, Texas.

O'NEAL Drilling Co., Lubbock, Tex., has finished contract on a wildcat in De Baca County, New Mexico, for the South Basin Oil Co. at 1 Good, 5-4s-20e. The test was bottomed in schist at total depth 4,779 ft.

PHIL YECKEL, of Carl B. King Drilling Co., left Midland, Tex., last week for the Marine base at Quantico, Va. He has been commissioned a first lieutenant.

BEACON Drilling Co. is the new firm style of the former Manahan Drilling Co., Tulsa. With the change in name of the company, its offices were moved to the Philtower Building. George H. Lang has been named vice president and general manager of the company. Mr. Lang was with the Manahan company for 4 years, coming to the company from the production department of Standard Oil Co. (New Jersey). Prior to going to New York with Standard, he was vice president of Carter Oil Co. Eolin Tripp, Ada, Okla., is president of Beacon Drilling Co., and E. J. Bonner is secretary-treasurer. The company operates in Kansas, Oklahoma, New Mexico and Louisiana in general oil and gas-well contracting and in drilling operations.

CHRISTIAN - CARPENTER Drilling Co., Houston, Tex., has begun work on a wildcat for J. A. Fite, in Brazoria County, Texas. It is 1 Darrington Prison Farm, planned to go 5,000 ft.

The JOHN R. WRAY and Associates Drilling Co. have completed a gas well on the John Brown farm in Kittanning Township, Armstrong County, Pennsylvania, which had an initial flow of 100,000 cu. ft. The well was drilled into deep sand at a depth of 3,450 ft. Several other tests are now being drilled by the Wray firm.

PARKER Drilling Co. holds contract for the Amerada Petroleum Co. 1 Lewis House, in C SE NW 2-1n-3w, north of the old Robberson shallow field in Oklahoma. Well was drilling below 6,198 ft., and it is to be a deep test.

GEORGE PACE has the drilling contract for the Harry Culver et al 1 Rennie, in SW NE NE 20-3n-1e, south of Pauls Valley, in Garvin County, Oklahoma. The contract is to the Bromide. Just south of this location the operator drilled a dry hole earlier this year.

RHODES Drilling Co. has contract to drill with rotary a wildcat test on a 1,400-acre block 4 miles north

THE QUESTION BOX

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Contractors

of Merkel, Taylor County, Texas. The 3,000-ft. Swastika test will be Merry Brothers & Perini et al 1 Tom Largent, 660 ft. out of the northwest corner of Block 37, De Witt County County School Land.

B. & C. Well Servicing Co., Houston, Tex., has contracts for two workover operations in the Texas Gulf Coast territory. One is for Gillespie & Sons, near South Cotton Lake, in the Goose Creek area, Chambers County. The other is on Stanolind Oil & Gas Co. 2 Thompson, near Bay City, Matagorda County.

KERR-McGEE & Co. has drilling contract and was moving in tools for a second Wilcox sand test to be drilled by Ace Gutowsky and D. D. Bourland, both of Oklahoma City, Okla., at the 1 Wagner, in NW NW SW 32-14n-4w, about 4 miles west of the Edmond field in northwestern Oklahoma County, Oklahoma. Expected depth of the test is 7,500 ft.

TWO STATES Drilling Co., Houston, Tex., is running a rig on 2 McCright, in Wood County, Texas, for Amerada Petroleum Corp. The hole is to go to 6,400 ft.

SIMPSON Oil Co. has the contract to drill the Bird, Hanley & Sheedy 1 Allen, in NW SW SW 32-16s-16w, in the northeastern corner of Rush County, Kansas. Materials were being moved in last week.

HOLLANDSWORTH Drilling Co. 1 Jim Hale, in the William C. Ward Survey, north of Lassater, Marion County, Texas, was spudding last week.

MORAN Drilling Co. has a contract for 3,600 ft., or the Viola lime, on Danciger Oil & Refineries 1 Moody, in C NE SE 28-5n-3e, near Byars pool, McClain County, Oklahoma, which last week was drilling at 1,750 ft.

J. S. ABERCROMBIE Co., Houston, Tex., is running two strings of tools for its own account in the Old Ocean field of Brazoria County, Texas. One is on 1-B McDonald and the other 1 Richardson. Each is to go about 10,000 ft.

MANNING & MARTIN, Inc., has been awarded contract on a 6,500-ft. test, of the Dakota series, location for which has been made on the Clark's Fork structure, Carbon County, Montana. It is the Northern Ordnance, Inc. 1 Government, C NW NW 25-9s-22e. The structure is adjacent to Elk Basin field.

FAIN Drilling Co., Houston, Tex., is about ready to spud Sun Oil Co. 1 D. D. Oil Co., in the Newman subdivision, El Benedito grant, western Hidalgo County, Texas. This hole, a wildcat test, is to go to 9,000 ft.

EVERTS Drilling Co. drilled its 3 Grier, in C SW SE 30-16s-31e, Eddy County, New Mexico, to 3,307 ft., shot with 320 qt. and pumped 70 bbl of oil a day through 2-in. tubing.

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Restrictions Modified on Spinning Lines, Cable

WASHINGTON, D. C.—Several additional uses for agave fiber and cordage are permitted by an amended version of Order M-84 announced last week by the director general for operations. These uses include:

Spinning lines for operation of oil and gas wells; drilling cables; scaling rope used in mines, grapnel cordage used in laying cables; governor ropes for elevators, 5/8-in. through 1-in. in diameter; life boat falls used for raising or lowering life boats, and wheel rope for steering equipment of sailing vessels.

Agave cordage can be sold as drop hammer rope on a rating of A-1-a or higher, the amended order states, and a similar rating is required for purchase of agave cordage used in construction, maintenance and repair operations.

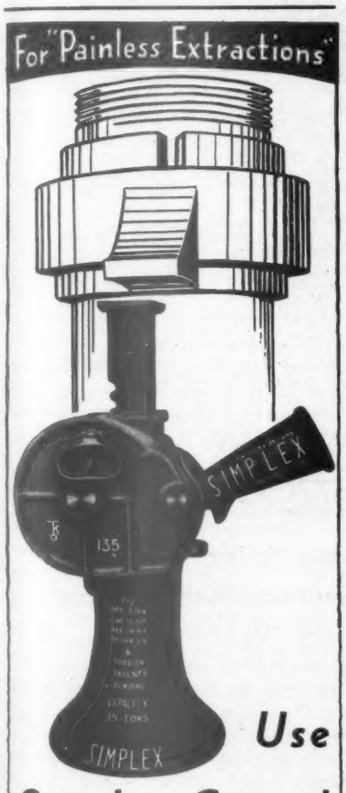
•

Contractors Consider Ruling on Seventh Day Pay

The recent ruling which requires double pay for a worker employed on the seventh consecutive work day was considered at a meeting last week of the officers and directors of the American Association of Oil-well Drilling Contractors. Drilling rigs have been operated on a 7-day schedule for many years with practically all contractors paying straight time. Some major companies with large drilling departments and a planned development campaign have followed a 5-day week, a relief crew being used to operate the rig the remaining 2 days.

Shortage of skilled workmen still is a problem in the drilling industry, although the recent announcement by the War Manpower Commission that men over 38 years would not be subject to draft was looked on as affording some relief.

Those attending the meeting included N. H. Wheless, Shreveport, La., president of the association; Howard Holmes, Dallas, Tex., vice president; Harry Bass, Dallas, treasurer; C. J. Paine, W. D. McBee and Howard Thompson, all of Dallas; George McQueen, C. J. Davidson and Hamilton Rogers, of Fort Worth, Tex.; W. C. Morris, San Antonio, Tex.; George Livermore, Lubbock, Tex., and John Chapman, of Houston, Tex.



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INDIANA, OHIO, KENTUCKY

Posey County Wildcat to Test Saturation in Clore Sand

EVANSVILLE, Ind.—Superior Oil Co. 1 A. Carr et al, NE NE SW 29-4s-13w, Posey County, 2½ miles northeast of New Harmony, at last reports was waiting for cement to set on 7-in. casing set at 1,948 ft. to test oil saturation found in the Clore sand at 1,885-1,925 ft. The 1 Carr et al is 4 miles from other oil production and was drilled to a total depth of 2,963 ft., through the McClosky lime which was dry.

Cherry & Kidd have staked location in Posey County for the 1 Walgrove Corp., NE SE NW 14-4s-14w. The new oil test is 4½ miles north of New Harmony and is a ¾-mile north outpost of the New Harmony field of White County, Illinois

INDIANA COMPLETIONS

Daviess County: General Oil 2 Singleton, NW SW SW 21-2n-7w, dry, T.D. 1,310 ft.
R. D. Brown 1 Kelly, S½ NE SW 16-2n-6w, dry, T.D. 886 ft.
Gibson County: Continental 58 Maier, N½ NW NW 7-3s-13w, dry, T.D. 2,497 ft., Cypress 2,466 ft.
R. D. Brown 4 Lehman, NW SE NW 36-1s-10w, 1,000,000 cu. ft. gas, pay 1,422 ft., T.D. 1,440 ft.
Posey County: Sohio 1 Ries-Eibert, SE NE NW 18-8s-13w, dry, T.D. 2,796 ft., St. Louis 2,784 ft.
Carter and Gulf 2 Oeth, SE SW SE 36-6s-14w, dry, T.D. 1,297 ft.
Spencer County: Spencer Development 1 Abshire, NE NE NW 14-7s-7w, dry, T.D. 1,618 ft., St. Genevieve 1,479 ft.
Vanderburg County: United Oil 2 Stader, NW SE NW 32-62-11w, pumped 100 bbl., Waltersburg sand 1,713 ft., T.D. 1,724 ft.

EASTERN KENTUCKY

ASHLAND, Ky.—An exceptionally good gas well was included in the report of drilling operations in eastern Kentucky last week and also a small oil well was drilled in. The Kentucky-West Virginia Gas Co. well No. 690 on the A. E. Justice tract in Pike County attracted considerable attention because of the gas production from the Weir formation, which is usually an oil-producing zone. However, oil was not expected in this area.

Operations in general were on a slightly upward trend with two new locations reported and in two other localities roads have been completed despite seasonable weather difficulties.

EASTERN KENTUCKY COMPLETIONS

Martin County: Virginia Gasoline & Oil Co. 4 J. B. Clark on Wolf Creek near W.P.A. road, pumped 2 bbl. oil a day from Maxon sand at 1,675-89 ft., T. D.
Pike County: Kentucky-West Virginia Gas Co. 690 A. E. Justice tract on Levisa Fork, flowed 3,320,000 cu. ft. gas, Weir sand 2,349 ft., T. D.

OHIO

ZANESVILLE, Ohio.—In the new Wellington pool of Lorain County, Glen Harmon 1 Karl Bittner was completed for 4,500,000 cu. ft. of gas a day in Clinton sand at 2,406-15 ft. Rock pressure was 1,000 lb. This is the third and largest producer for the field and is located northeast of the other two wells. Four wells have been drilled in the field, one of which was dry.

OHIO COMPLETIONS

Ashland County, Lake Township Ohio Fuel 1 A. H. Kopp, Sec. 16, Clinton, dry, T.D. 3,019 ft.
Vermillion Township: Stewart et al 1 Frank M. Craig, Sec. 16, Clinton, 496,000 cu. ft., T.D. 2,714 ft.
Athens County, Canaan Township: Choquill et al 3 R. W. White, Sec. 3, Berea, 85,000 cu. ft., T. D. 1,623 ft.
Carthage Township: C. W. Nuzum 3 Jas. R. Fish, Sec. 35, Cow Run, 3 bbl., T.D. 538 ft.
Coshocton County, Tiverton Township: Ohio Fuel 1 Gus Sannier, Sec. 8, Clinton dry, T.D. 3,385 ft.
Lorain County, Columbia Township: Ohio Fuel 1 C. W. Wallweber, Lot 95, Clinton, 709,000 cu. ft., T.D. 2,629 ft.
Ohio Fuel 2 Kuntz Properties, Lot 98, Clinton, 120,000 cu. ft., T.D. 2,710 ft.
Wellington Township: Glen Harmon 1 Karl Bittner, Lot 1, Clinton, 4,500,000 cu. ft., T.D. 2,460 ft.
Ohio Fuel 1 Earl E. Parsons, Lot 2, Clinton, dry, T.D. 2,485 ft.
Medina County, Granger Township: Ohio Fuel 1 Andrew Edwards, Lot 58, Clinton 386,000 cu. ft., T.D. 3,546 ft.
Meigs County, Rutland Township: Taylor et al 1 E. M. Brown, Sec. 26, Maxon, 56,000 cu. ft., T.D. 749 ft. (drilled deeper).
Salem Township: Downie et al 1 Wm. Hampton, Sec. 14, Maxon, dry, T.D. 730 ft.
Monroe County, Benton Township: C. D. Uhl et al 3 Wm. Dillon, Sec. 29, Keener, dry, T.D. 1,654 ft.
Franklin Township: Robt. Lewis 1 Jas. Wilson, Sec. 1, lime, 4 bbl., T.D. 1,600 ft.
Washington Township: Hall & Henning 3 Dye and Newell, Sec. 17, Berea, 44,192 cu. ft., T.D. 2,163 ft.
Morgan County, York Township: Industrial Gas 1 Boyd Divers, Sec. 27, Clinton, 391,000 cu. ft., T.D. 4,246 ft.
Seneca County, Hopewell Township: W. H. Morrow 1 Hostler, Sec. 3. Trenton, dry, T.D. 1,557 ft.
Summit County, Portage Township: Star Drilling Mach. Co. 1 fee, Clinton, 356,000 cu. ft., T.D. 3,850 ft.
Wayne County, Green Township: Hanley & Bird 1 Isaac Pontius, Sec. 23, Clinton, 87,000 cu. ft., T.D. 3,769 ft.
Wood County, Plain Township: Inman & Stevens 1 R. Kramer, Sec. 35, Trenton, 3 bbl., T.D. 1,600 ft.
Washington Township: Jim Bralev 1 Bevestock, Sec. 36, Trenton, 2 bbl., T.D. 1,758 ft.

NORTH LOUISIANA, ARKANSAS

Nebo Outpost Is Dry With a Small Show of Gas in Sparta

SHREVEPORT, La.—Operations in the North Louisiana-Arkansas area settled to a more routine function over the past week. Two wildcat completions were reported, one each in Arkansas and Louisiana. In Calhoun County, 5 miles southeast of Artesian and 12 miles north of production in Union County, Placid Oil 1 Freeman-Smith was dry at 5,206 ft. The well had attracted considerable attention. Three miles northwest of the active Nebo pool in La Salle Parish. Aden Oil Co. 1 Grey had a show of gas in the Sparta zone at 1,750 ft. but was dry at total depth of 3,697 ft.

ARKANSAS COMPLETIONS

Wildcat, Calhoun County: Placid Oil 1 Freeman-Smith, NE SE 24-15s-13w, dry, T.D. 5,206 ft.
Fouke, Miller County: Carter Oil 1-E W. P. Sturgis, NW NE NW 11-17s-27w, pumped 243 bbl., Sturgis sand 3,618-22 ft., T.D. 3,839 ft.
New London, Union County: Marine Oil 5 Frost, NE SW 12-18s-12w, flowed 65 bbl., 20 per cent salt water, perf. 5,693-5,707 ft., T.D. 5,950 ft.

NORTH LOUISIANA COMPLETIONS

Wildcat, La Salle Parish: Aden Oil 1 J. T. Grey, NE NE 36-8n-2e, dry, T. D. 3,697 ft., Sparta 1.750-57 ft., show gas, Wilcox 2,348 ft.
Caddo, Caddo Parish: Bayou State Oil Corp. 51 K. W. Brown, SW NW NE 27-20n-16w, dry, T. D. 1,207 ft.
Cotton Valley, Webster Parish: Cotton Valley Operators 1 Grant Oil Co., CN½ SE 12-21n-10w, 7,200,000 cu. ft. through ½-in. choke, 1,900 lb. T.P., Bodcaw 8,490-8,519 ft., T.D. 8,600 ft.
Haynesville, Claiborne Parish: R. A. Stacy 1 Hudson-Saks, NE NW 25-23n-8w, flowed 245 bbl. in 5 hr., Pettit 5,404-08 ft., 5,414-20 ft., 5,462-68 ft., T.D. 5,505 ft.
Lake St. John, Concordia Parish: California Co. 3-A D. V. Applegate, Sec. 13-9n-10e, pumped 16 bbl., pay 4,554-64 ft., T.D. 4,690 ft.
Sligo, Bossier Parish: Triangle Drilling 4-B Murff, NE SE 19-17n-11w, pumped 40 bbl., lime pay 3,170-76 ft., T.D. 3,188 ft.

MISSISSIPPI COMPLETIONS

Wildcats

Franklin County: Amerada 1 Central Lumber Co., 10-7n-3e, dry, T. D. 11,802 ft., Vicksburg 1,683 ft., Jackson 1,750 ft., Moody Branch 2,198 ft., Cockfield 2,235 ft., Cook Mountain 2,543 ft., Cook Mountain lime 2,707 ft., Sparta 2,842 ft., Cane River 3,523 ft., Tallahatta 3,913 ft., Wilcox (approx.) 4,083 ft., Midway 7,432 ft., Selma 8,720 ft.; Determined from samples, Tuscaloosa 9,910 ft., Marine Tuscaloosa 10,382 ft., Glen Rose lime 10,962 ft.

Permian Basin, Panhandle

(Continued from Page 59)

Continental Oil 8-"c" Sanford, Sec. 79, Blk. 46, H. & T. C. Ry. Co. Sur., elev. 2,816 ft., pumped 280 bbl., pay 2,681-2,775 ft., T.D. 2,790 ft.
Moore County: Phillips Pet. 1 Stan (Coon), Sec. 233, Blk. 44, H.&T.C.Ry. Co. Sur., elev. 3,609 ft., 14,500,000 cu. ft., pay 2,880-3,280 ft., P.B. 3,290 ft., T. D. 3,330 ft.
Potter County: U. S. Bureau of Mines 1-A Bivens, Sec. 26, Blk. 6, B. S. & F. Sur., elev. 3,433 ft., pay 3,291 ft., T.D. 3,490 ft., (helium well).

SOUTHEAST NEW MEXICO

HOBBS, N. M.—Three new wildcats were under way in the Southeast New Mexico district as the week ended. In Eddy County, Broderick et al had moved in on their 1 State, NE SE Section 8, Township 17s, Range 29e, ½ mile northwest of a well drilled by Herbert Aid and making about 10 bbl. per day from 2,405-12 ft. In Quay County, Stanolind Oil & Gas Co. had moved in tools to drill to 8,000 ft. at the 1 J. W. Fuller, located NE NE Section 25, Township 8n, Range 30e, while in Lea County Felmont Corp. had rigged up rotary at 1 State, Lot 11, Section 5, Township 21s, Range 33e, west of the Lynch pool.

SOUTHEAST NEW MEXICO COMPLETIONS

Wildcats

DeBaca County: South Basin Oil 1 Good, NE NE Sec. 5, T. 4s, R. 20e, broken lime 3,812 ft., schist 4,750 ft., dry, T.D. 4,779 ft.
Lea County: Carper Drilling 1 Miller, SW NW Sec. 19, T. 19s, R. 32e, elev. 3,553 ft., pay 2,616 ft., pumped 200 bbl. 24.6-gravity, T.D. 2,680 ft., lime.

Fields

Eunice, Lea County: Tex-Pac Coal & Oil 23 State Acct. 2, SE NE Sec. 8, T. 22s, R. 36e, elev. 3.585 ft., flowed 192 bbl., pay 3,800 ft., acid 3,000 gal., T.D. 3,870 ft.
Grayburg, Eddy County: R. R. Woolley 2 "A" Arnold, SW NE Sec. 26, T. 17s, R. 30e, elev. 3,635 ft., flowed 145 bbl., shot 150 qts. nitro, pay 3,250 ft., T.D. 3,300 ft.
Leonard, Eddy County: Western Prod. 4-C Burch, NW SE Sec. 23, T. 17s, R. 29e, flowed 90 bbl., pay 2,822 ft., P.B. 2,915 ft., T.D. 3,058 ft.
Monument, Lea County: Oro Peso Oil (formerly McGarr) 2-A Weir, NW SE SW Sec. 3, T. 20s, R. 37e, elev. 3,550 ft., shot 150 qts. nitro 3,812-3,880 ft., P.B. 3,880 ft., T.D. 3,929 ft.
Square Lake, Eddy County: Barney Cockburn 2 A. N. Etz, SW SW Sec. 26, T. 18s, R. 30e, lost tools in hole, abandoned 2,665 ft.
Barney Cockburn 1-X A. N. Etz, SE SE Sec. 26, T. 16s, R. 30e, elev. 3,813 ft., flowed 125 bbl., pay 3,435 ft., T.D. 3,473 ft.
Barney Cockburn 13-X A. N. Etz, SE NE Sec. 35, T. 16s, R. 30e, elev. 3,788 ft., flowed 165 bbl., pay 3,045 ft., T.D. 3,095 ft.
Continental Oil 4-36 State, NW NW Sec. 36, T. 16s, R. 30e, flowed 135 bbl., pay 2,977 ft., T.D. 3,030 ft.
Everts Drilling 3 Grier, SW SE Sec. 30, T. 16s, R. 30e, elev. 3,834 ft., pumped 70 bbl., pay 3,246 ft., shot 320 qts. nitro, T.D. 3,307 ft.
J. N. Fidel 1 Grier, SE SE Sec. 30, T. 16s, R. 31e, elev. 3,861 ft., flowed 75 bbl., pay 3,172 ft., T.D. 3,267 ft.

CANADIAN FIELDS

North Turner Valley Well Has Large Flow From Madison Lime

By VICTOR LAURISTON

CHATHAM, Ontario.—In North Turner Valley, Atlas-British Dominion 3, LSD 3, 17-21-3w5, finished at 8,614 ft. with Madison limestone at 8,180 ft., flowed 648 bbl. on a 24-hour test and has been given allowable of 625 bbl. daily.

This completion extends the producing area a quarter mile east of Atlas-British Dominion 2, previously the most northerly producer.

Home Oil 12, LSD 9, 5-21-3w5, plugged back from 9,019 ft. after encountering water in the lower porous zone, gave initial production of 36 bbl. hourly from the upper zone, later settling to 340 bbl. daily with gas-oil ratio of 2,600 cu. ft.

TURNER VALLEY LIME TESTS

North Turner Valley: Northwest-Hudson's Bay 11, LSD 15, 8-21-3w5, below 8,011 ft., Madison 7,930 ft.
Miracle Royalties 3, LSD 13, 33-20-3w5, Madison 7,880 ft., resuming after cementing casing. Encountering lime in this test opens a further west-flank area for drilling.
West-Central Section: Royalite Oil 69, LSD 8, 35-19-3w5, below 7,780 ft., Madison 7,476 ft.

Vermilion Field

Preliminary work for the proposed new drilling campaign of Cannar Oils, subsidiary of the Canadian National Railways, in the Vermilion field, eastern Alberta, is being planned from Calgary, with J. M. Penny, president of the company, in

(Continued on Page 69)

Personal Paragraphs

ANTOINE LACOMBLE, vice president of Shell Oil Co., Inc., with offices in San Francisco, Calif., was married recently to Corrine Carolyn Frederick, of St. Louis, Mo.

STARK FOX, who has been publicity director and assistant to Rush Blodget, general manager of the Oil Producers Agency of California, has been ordered to active duty with the Navy and will report as lieutenant at Quonset, R. I.

PHIL H. BOHART, assistant to the executive vice president of Gulf Oil Corp. and Gulf Refining Co., Tulsa, has been elected first vice president of the Tulsa Chamber of Commerce. BARTON P. SIBOLE, president, Stanolind Pipe Line Co., was elected second vice president.

A. J. MARTIN, formerly employed in the treasury department of Humble Oil & Refining Co., Houston, Tex., is now in the Navy, serving as a specialist, second class, in Washington, D. C.

B. R. GOSSETT, assistant district superintendent for Humble Oil & Refining Co., in the Raccoon Bend district, Austin County, Texas, has been transferred to the Lovell's Lake district, Jefferson County, Texas.

EDWARD F. CLAGGETT, manager of the Michigan producing division of Pure Oil Co., has been appointed chairman of the Michigan committee of the Great Lakes region committee on protection of petroleum facilities.

JERE IVY has been named safety engineer for Carter Oil Co., Tulsa, to succeed JOHN D. McCAMEY, now a captain in the Army Engineering Corps. Mr. Ivy was with Standard Oil Co. of Louisiana before being transferred to Tulsa.

L. P. O'NEIL has been elected chairman of the East Texas chapter of the American Petroleum Institute. Vice chairmen are M. E. ZOLLER, D. M. KERR, and BRYAN PAYNE, and secretary-treasurer is C. R. WEBB. J. P. O'TOOLE is assistant chairman.

LT. C. B. METCALFE, formerly in the geophysical-drafting department of Shell Oil Co., Inc., in Houston, Tex., was sent to Harrisburg, Pa., to study aerial photographic interpretation, with a course in the photo intelligence school to follow. That work done, it looked as though he might be sent to one of the oversea fronts.

EDGAR A. WAITE has been named to head the public-relations work for Standard Oil Co. of California. For the past 5 years Mr. Waite has been vice president of Braun & Co.

L. H. ATKINSON announces the dissolution of the Jones-Atkinson Corp., of New York City, and that he will resume his status as marketer of petroleum products under the name of Atkinson Petroleum Co. Mr. Atkinson's address will be 9 Rockefeller Plaza, New York.

DR. BLAINE B. WESCOTT, chief of the materials and products chemistry division of Gulf Research & Development Co., Pittsburgh, Pa., has been appointed a member of the sectional committee of pipe threads of the American Standards Association. The scope of the committee covers the American (Briggs) standard taper and straight pipe threads, plumber's threads, threads for electrical conduit and threads for thin tubes.

E. H. GRISWOLD

E. H. GRISWOLD, oil producer of Ector County, Texas, has been named successor to E. A. WAHLSTROM as chief engineer of the Goldsmith Pool Engineering Committee. Mr. Wahlstrom resigned to accept a naval commission. Mr. Griswold was at one time chief engineer for Continental Oil Co. More recently he was associated with Rush Brothers, Rushwold Drilling Co., and Trinity Drilling Co., as well as supervising his own properties.

Shifts: C. A. JACKSON, superintendent, Stanolind Oil & Gas Co., Grandfalls, to Imperial, Tex.; LEO RANNEY, president, Ranney Oil Mining Co., Franklin, Pa., to Columbus, Ohio; C. G. ADAMS, JR., geologist, Texas Co., Gillette to Douglas, Wyo.; J. P. GARNER, engineer, Texas Co., Douglas, Wyo., to Waurika, Okla.; J. C. FINNERAN, engineer, Warren Petroleum Corp., Madill, Okla., to Crossville, Ill.; GEORGE T. SIMS, superintendent, Kerlyn Oil Co., Oklahoma City, to Norman, Okla.; HUGH A. WALLIS, engineer, Carter Oil Co., Great Bend, Kans., to Royalite Oil Co., Turner Valley, Alberta, Canada.

Do You Remember?

From The Oil and Gas Journal Files

40 YEARS AGO (1902)

It is reported that the refinery being constructed at Jennings is being pushed and several buildings are nearing completion. The finished loading racks will accommodate 22 cars.

Count A. de Marchena and his interpreter, A. Auerbach, are in Texas from Paris, and are said to be making an investigation of certain Spindletop properties offered to a Paris syndicate represented by the nobleman.

25 YEARS AGO (1917)

It is estimated that 959,000 gal. of gasoline a day will be required for the use of Army, Navy, and aeronautical operations during the coming year. The total daily gasoline production is about 6,849,000 gal.

There are 60,000 miles of pipe lines used for the transportation of oil in the United States, according to statistics recently published.

At Dover, Del., the Kentucky Star Oil Co., of Lexington, Ky., has been incorporated with capital stock of $500,000. At Dover, also, the Lewis Run Gasoline Co., Bradford, Pa., capital stock $400,000, has been incorporated.

10 YEARS AGO (1932)

The Texas Co. is now adding stabilizers to four of its natural-gasoline plants in Oklahoma and Kansas. New units are in the process of erection at Atlanta, Kans., and at Pawhuska, Davenport, and Kiefer, Okla.

A program of activities calculated to protect users of petroleum products from excessive taxation and unfair legislation has been announced by the American Petroleum Industries Committee, headed by Baird H. Markham.

P. H. Curry, vice president of South Penn Oil Co. since 1918, was elected president this week, succeeding L. W. Young, Jr., who died December 9.

HUGH DUFFEY, secretary-treasurer of Midway-Victory Oil Co., was elected a director of the Panhandle Producing & Refining Co. last week.

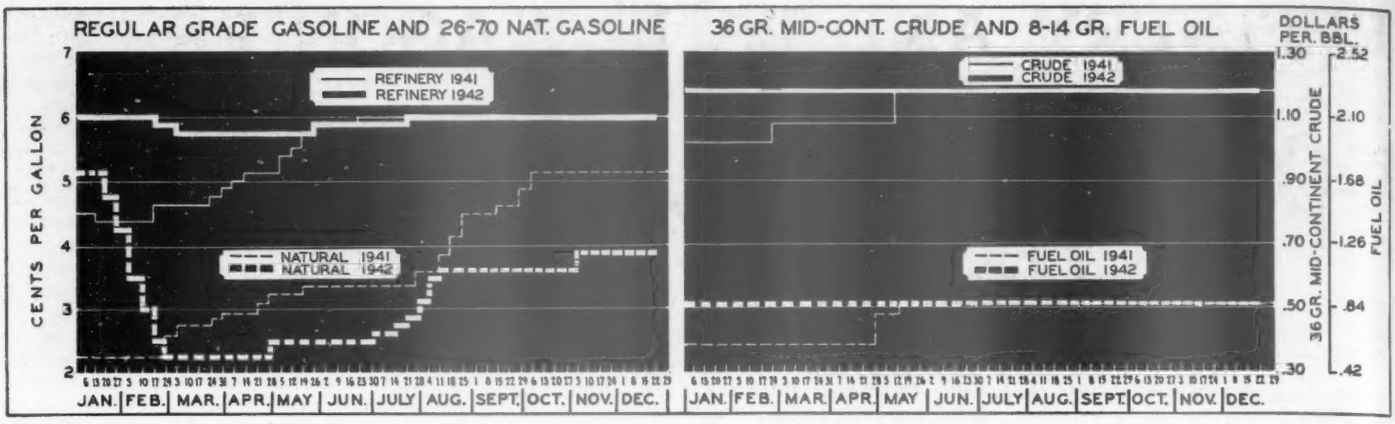
T. W. LEE, Gladewater, Tex., has acquired 85 per cent of the stock of Gregg Oil Co., a producing company in East Texas, and the company has been dissolved.

REX L. DAWSON has been transferred from Tulsa to Mattoon, Ill., as division land man for the eastern division of Carter Oil Co. His family will join him in Mattoon shortly after Christmas.

A. W. LLOYD, geologist for Sun Oil Co., in Dallas, Tex., was the speaker Thursday, December 17, at the weekly meeting of the Houston (Tex.) Geological Society in the Texas State Hotel. Mr. Lloyd discussed "The Jurassic of Northern Louisiana and Southern Arkansas." He is distinguished as an authority on the Smackover limestone.

HENRY W. WILSON, president of Panhandle Producing & Refining Co., Wichita Falls, Tex., resigned last week to be succeeded by SERGE RUBINSTEIN, of New York City. It is reported that Mr. Wilson plans to assume direction of the oil and gas properties recently acquired by British-American Equities and affiliated American interests.

DUANE C. RANDALL, head of the reserve division of Carter Oil Co., Tulsa, has been transferred to New York City where he will become engineering analyst of the economics department of Standard Oil Co. of New Jersey. He is succeeded by JOHN O. CAMPBELL, JR., who will work under the supervision of RAYMOND D. SLOANE, chief statistician.



MARKET DEVELOPMENTS . . .

East Coast

NEW YORK.—The East Coast supply situation became so critical last week that complete suspension of A cards was ordered for a brief period and the entire rationing structure was modified. Increased exports from the East Coast, particularly of high-grade gasoline, were chiefly responsible for the acute civilian supply situation.

The failure of existing rationing plans to effect a sufficient curtailment of gasoline consumption and the confusion attendant to the rationing of heating oil, stimulated sentiment for an allocation plan whereby essential requirements would be assured. This type plan had been urged previously for fuel oil and is now receiving some support for gasoline. One oil-company official estimated his company's current supplies of motor fuel as being equal to a single day's normal demand and urged that allocation be undertaken to insure that necessary services would be accommodated.

Lack of fuel oil, used in the manufacture of gas, was cited by the Consolidated Edison Co., New York's largest utility, to urge consumers to limit their use of manufactured gas as much as possible.

Gulf Coast

HOUSTON, Tex.—Indications of rising strength in the Gulf Coast gasoline market were observed this week. All the reasons for its improved position were not clear but one which resellers stress is that some marketers who were pretty well cleaned out by the lively demand which preceded the introduction of rationing are now encountering difficulty in replenishing their stocks.

Accumulations of gasoline in the Gulf Coast territory which a week ago were beginning to cause a little concern appear to have shrunk appreciably.

Absence of adequate transportation facilities continues to be a perplexing problem. The recent action of the Office of Defense Transportation designed to reduce the time for a round trip of tank cars in eastern oil service has brought no noticeable relief yet, according to Gulf Coast marketers. Complaints are heard that tank cars which should be back from an eastern trip in 8 days are actually away for 12 to 14.

Natural gasoline has lost none of the strength that has characterized it for weeks. Kerosene and the fuel oils were extremely tight. No. 2 fuel oil was in especially urgent demand, resellers being bombarded with inquiries from eastern buyers to which they usually were obliged to make negative response. Although a definite drop in demand for lubricating oils has accompanied the reduced mileage of motor vehicles resulting from speed regulations and gasoline rationing, prices were said to be steady.

SENTENCE SUMMARIES

EAST COAST: Modified distribution resumed Supply breakdown may bring changes in policies and administration.

MID-CONTINENT: Inquiries from eastern buyers offset tendency of gasoline demand to slacken.

GULF COAST: Markets remain in strong position. Tanker movements reported higher, destinations undisclosed.

PACIFIC COAST: Interest stimulated in fuel oils. Gasoline business following routine lines at reduced volume.

PENNSYLVANIA: Refinery runs continue to exceed production, reflecting strong demand for products.

Mid-Continent

INQUIRIES from eastern refiners and distributors are playing an increasingly important role in the Mid-Continent motor-fuel market and this week served to emphasize the scope of this marketing trend. Mid-Continent plant operators reported that eastern buyers were willing to purchase practically any quantity of gasoline offered and, so far, have shown no particular resistance to current quotations of unchanged prices.

Acute nature of the gasoline-supply picture on the East Coast, reflected last week in complete cessation of deliveries to A-card holders for a few days, indicates that interior refiners will be able to sell all the gasoline they can move into the hands of eastern distributors. Unexpectedly large shipments to armed forces in North Africa is the chief reason for present depletion of high-quality gasoline and more severe shortages than anticipated in other petroleum products.

There has been no substantial change in the volume of oil transported overland by railroads, although some of the new policies on speeding up train and car turnarounds doubtless will benefit shippers in the near future. Government agencies, according to reports in the Mid-Continent this week, are prepared to impose more stringent regulations on shippers if the present orders and directives fail to produce the desired results.

Demand continued active this week for all grades of fuel oil. Railroads were among the most active purchasers and practically all carriers registered interest in expanding their buying. War plants are also calling for larger volumes of fuel oil. Cold weather in parts of the country caused OPA authorities to advance the effective date approximately 2 weeks for fuel-oil ration Coupon 3.

Natural gasoline demand continues to exceed available supplies. Shipments are high to northern and eastern destinations. Prices are unchanged at previous levels.

Pacific Coast

LOS ANGELES, Calif.—Marketers are still waiting to see what effect rationing will have on their accounts and particularly with reference to probable discontinuance of credit cards. Gasoline sales were along routine lines this week at unchanged prices. Very little is moving in the spot market.

Demand for fuel oil continues and is expected to reach higher levels over a long range outlook. Much depends upon disposition of the crude oil that has heretofore been processed by Douglas Oil & Refining Co. If this crude oil is sold to major buyers it will reduce the amount of fuel oil that heretofore has been available in the spot market.

The seller's market that has prevailed for diesel fuel and gas oil for several months continues and there is nothing to indicate any change. Major buyers will take any and all quantities offered, paying top prices.

Little natural gasoline is moving and marketers are trying to increase stocks wherever possible.

A.P.I. REFINERY REPORT

For Week Ended December 12, 1942

(Figures in thousands of barrels)

	Dly. crude runs to stills	Stocks		
		Gasoline	Residual	Gas oil
Appalachian	151	2,610	376	713
Ind., Ill., Ky.	757	13,481	2,044	6,164
Okla., Kans., Mo.	361	5,805	1,329	2,055
Censored area*	1,698	36,821	15,487	25,919
Rockies	95	1,427	525	373
California	684	17,478	55,024	12,570
Total Dec. 12, 1942	3,744	77,622	74,785	47,794
Total Dec. 5, 1942	3,760	75,934	75,219	48,663
Total Dec. 13, 1941	4,009	88,862	94,386	53,507

Note: Refinery runs and stocks for week ended December 19, 1942, appear on Trends page.

*Reports combined on East Coast, Texas Gulf, Louisiana-Arkansas and Inland Texas at request of PAW.

CRUDE-OIL STOCKS

(Bureau of Mines Estimate)

Week ended:	Bbl. of crude*
December 12, 1942	231,896,000
December 5, 1942	232,982,000
December 13, 1941	242,683,000

*Excludes heavy, unrefinable stock in California.

REFINERY AND TANK-WAGON PRICES

(Prices as of December 22)

Refinery Gasoline

Octane (A.S.T.M.):	†80	78	74.76	72-74	68-70	63-66	60 & lower
Mid-Continent*	.....	.....	.....	5.875-6.000	.....	5.500-5.625	5.125-5.250
Pennsylvania	.....	.....	6.750-7.000	.....	.....	.....	.....
Gulf Coast‡	6.00-6.50	.....	.....	$5.750-6.250	$5.750-6.250	$5.250-5.750	$5.000-5.500
Northeast Coast	9.80	.....	.....	9.2	9.2	.....	.....
Pacific Coast	.....	6.500-7.000	6.250-6.500	6.125-6.250	5.750-6.000	5.125-5.250	4.750-5.000

*Basis Group 3. †1939 C.F.R. (research method). ‡Integrated companies restricted to lowest prices. §Unleaded.

Quotations are f.o.b. plant in cars and in cents per gallon except where otherwise noted. They are exclusive of the federal excise taxes of 1.5 cents a gallon on gasoline and 4.5 cents a gallon lubricating oils, and do not include marine lighterage charges.

Natural Gasoline

Grades:	26-70	18-55	75-85(350-375)
Oklahoma (Group 3)	3.875	4.650	.....
North Texas	3.500	4.200	.....
North Louisiana	3.625	4.350	.....
California	.....	.....	4.875-5.500

Kerosene and No. 1 Fuel Oil

Gravity:	46	45	42-44	41-43	38-40
Mid-Continent*	.....	.....	4.500	4.375	.....
North Louisiana	.....	.....	.....	4.500-4.750	.....
Pennsylvania	6.250-6.625	6.125-6.250	.....	.....	.....
California	.....	.....	.....	4.500-5.500	4.250
Northeast Coast	.....	.....	.....	6.80	.....
Gulf Coast	.....	.....	.....	3.875	.....

*Basis Oklahoma Group 3.

Tractor, Diesel, and Bunker Fuel Oil

Specifications:	†6-48° G.	24 D.I.	48-52 D.I.	58 & above	Diesel bunkers	Bunker C
Mid-Continent*	4.125	.....	.....	.....	.....	.....
California	.....	2.750-4.000	.....	.....	‡$1.35-1.45	$0.85-0.90
Gulf Coast	.....	.....	4.000	4.125	1.45	0.85
Northeast Coast	.....	.....	.....	6.800	2.780	1.65
North Louisiana	.....	.....	.....	.....	.....	†0.80-0.85

*Basis Oklahoma Group 3. †10-14° gravity. ‡Pacific Specification 200.

Furnace Oil, Gas Oil, Fuel Oil

	No. 2	No. 3	No. 5	No. 6
Mid-Continent*	3.625-3.750	3.500-3.625	$0.85	$0.80
Pennsylvania (West)	5.875-6.125	5.875-6.000	†5.250-5.500	.....
Northeast Coast	6.7	6.7	1.95	1.65
Pacific Coast	5.5	5.5	†0.80-95	$0.80
Gulf Coast	3.875-40	.....	1.65	0.85

*Basis Oklahoma Group 3. †36-40 gravity fuel oil. ‡Pacific Specification 300. §Pacific Specification 400.

Lubricating Oils

Bright and Steam Refined

OKLAHOMA (Group 3)—		
200-210 D, 10-25		27.00
150-160 D, 0-10		23.00
120-125 D, 0-10		22.00
Steam refined:		
600 dark green (untreated)	9.00	9.50
PENNSYLVANIA—		
Bright Stocks (Pennsylvania Grade No. 8 color, 140-150 at 210, 545-550 flash):		
10 pour point		30.50
15 pour point		29.50
25 pour point	25.00	28.00
Steam refined:		
600	15.00	16.00
650	15.50	16.50
600 flash	16.00	17.50
630 flash	17.00	17.50

Neutral Oil

(Vis. at 100° F. except Pennsylvania and color N.G.A.)

OKLAHOMA (Group 3)—	
0-10 pour point:	
200-3	15.00
300-3	18.00
500-3	19.50
600-3	20.00

Note: Viscous neutrals, 10-25 pour, quoted 0.5 cent under 0-10 oils.

Wax

(Cents per pound)

OKLAHOMA (Group 3)—	
124-126 (A.m.p.) w.c. scale	4.250
PENNSYLVANIA (Inland refineries)—	
122-124 (A.m.p.) w.c. scale	4.250
124-126 (A.m.p.) w.c. scale	4.250

Neutral Oil

CALIFORNIA—		
Pale oils:		
200-2½-3	7.00	7.75
400-3-4	7.25	8.00
600-3-4	8.75	11.00
Red oils:		
200-4-5	7.00	7.75
400-5-6	9.00	11.00
500-900, 5-6½	9.25	11.25
GULF COAST—		
Pale oils:		
200-3	8.50	8.75
300-3	9.00	9.25
500-3½	9.75	10.00
750-3½	10.00	10.25
2,000-4	10.50	10.75
3,000-4	12.25	12.50

PENNSYLVANIA—	
150 vis. at 70° F., 3 color, 400-405 flash:	
Zero pour point	37.50
10 pour point	36.50
15 pour point	35.50
25 pour point	30.00
200 vis. at 70° F., 3 color:	
Zero pour point	39.50
10 pour point	38.50
15 pour point	37.50
25 pour point	32.00

NEW YORK—	
Wax in bags fully refined:	
130-132 (A.m.p.) wax	5.850
133-135 (A.m.p.) wax	6.150
Crude scale:	
124-126 (A.m.p.) w.s.	4.250
124-126 (A.m.p.) y.s.	4.250

EXPORT PRICES

Gasoline—60-62° Gravity, Maximum 400 End Point

Octane:	72-74	68-70	65-66	60
Gulf Coast	6.050	6.250-6.500	5.875	5.625
Pacific Coast	.....	6.125-6.500	5.875-6.000	5.500-5.625

Distillate and Fuel Oil

	Kerosene 41-43	Diesel fuel: 24 G.	48-52 D.I.	58 D.I.	Bunkers	Bunker C grade
Gulf Coast	4.000-4.250	.....	4.125-4.375	4.375	$1.65-80	$0.85-90
Pacific Coast	4.750-5.000	1.25-30	.....	.....	†1.35-45	*0.80-90

*Pacific Specification 400. †Pacific Specification 200.

Lubricating Oils

	Neutral oils: 200-3	150-3	Bright and cylinder stocks: 200-3	150-3	600&630 S.R.
Mid-Continent	16.8	.....	28.8	24.8	.....
Pennsylvania	43-50	41-46	36-37	36-37	26.5-27

GASOLINE AND KEROSENE TANK-WAGON PRICES IN 50 CITIES

(Gasoline prices based on regular grades, tax included, undivided dealer)

ATLANTIC AND NEW ENGLAND

(Socony-Vacuum Oil Co., Inc., and Atlantic Refining Co.)

	Dealer tank wagon	Combined tax	Kero tank wag.
Baltimore, Md.	15.45	5.50	10.20
Boston, Mass.	14.90	4.50	9.50
Burlington, Vt.	16.90	5.50	...
Buffalo, N. Y.	16.20	5.50	10.30
Dover, Del.	16.70	5.50	11.20
Hartford, Conn.	15.60	4.50	....
Manchester, N. H.	17.30	5.50	10.50
Newark, N. J.	14.70	4.50	9.40
New York, N. Y.	16.10	5.50	9.50
Philadelphia, Pa.	16.20	5.50	11.65
Pittsburgh, Pa.	16.70	5.50	12.00
Portland, Me.	16.30	5.50	9.60
Providence, R. I.	15.00	4.50	9.30
Washington, D. C.	14.70	3.50	10.70
Average 14 cities	15.91	5.07	10.32

(All prices undivided dealer basis.)

CENTRAL

(Standard Oil Co. of Indiana, Standard Oil Co. of Ohio, Continental Oil Co. and Texas Co.)

	Dealer tank wagon	Combined tax	Kero tank wag.
Chicago, Ill.	13.40	4.50	10.30
Cleveland, Ohio	15.00	5.50	*9.00
Dallas, Tex.	13.00	5.50	7.00
Des Moines, Iowa	14.40	4.50	9.80
Detroit, Mich.	14.40	4.50	9.60
Fargo, N. D.	16.90	5.50	11.30
Huron, S. D.	16.30	5.50	10.70
Indianapolis, Ind.	15.20	5.50	9.80
Little Rock, Ark.	17.50	8.00	10.00
Milwaukee, Wis.	16.10	5.50	10.50
Minneapolis, Minn.	15.40	5.50	10.30
Omaha, Neb.	15.40	6.50	9.80
Tulsa, Okla.	16.50	7.00	8.50
Wichita, Kans.	12.70	4.50	8.00
Average 14 cities	15.15	5.57	9.61

*Includes 1-cent state tax.

SOUTHEASTERN

(Standard Oil Companies of New Jersey, Kentucky, and Louisiana)

	Dealer tank wagon	Combined tax	Kero tank wag.
Atlanta, Ga.	21.40	7.50	11.40
Birmingham, Ala.	18.50	8.50	9.00
Charleston, S. C.	18.45	7.50	...
Charleston, W. Va.	18.75	7.50	13.00
Charlotte, N. C.	19.60	7.50	11.00
Jacksonville, Fla.	21.40	8.50	10.40
Jackson, Miss.	17.50	7.50	8.50
Louisville, Ky.	16.50	6.50	8.50
Memphis, Tenn.	18.60	8.50	10.50
New Orleans, La.	16.75	8.50	*10.00
Norfolk, Va.	16.95	6.50	13.50
Average 11 cities	18.58	7.59	10.58

*Includes 1-cent state tax.

MIDWESTERN

(Continental Oil Co.)

	Dealer tank wagon	Combined tax	Kero tank wag.
Albuquerque, N. M.	17.50	7.50	10.00
Boise, Idaho	20.10	6.50	16.50
Casper, Wyo.	17.00	5.50	12.00
Denver, Colo.	14.50	5.50	11.00
Helena, Mont.	17.00	6.50	13.00
Phoenix, Ariz.	18.50	6.50	12.50
Reno, Nev.	17.50	5.50	13.50
Salt Lake, Utah	18.50	6.50	14.50
Average 8 cities	17.58	6.25	12.88

PACIFIC COAST

(Standard Oil Co. of California)

	Dealer tank wagon	Combined tax	Kero tank wag.
Portland, Ore.	17.00	6.50	13.50
San Francisco, Calif.	14.50	4.50	11.50
Seattle, Wash.	17.00	6.50	13.50
Average 3 cities	16.17	5.83	12.83
Average 50 cities	16.57	5.96	10.76
Average last week	16.57	5.96	10.76

Canadian Fields

(Continued from Page 66)

charge. It is expected that work will be started early in 1943. The initial drilling program calls for a total of 50 wells and arrangements have already been made for the necessary casing. Further drilling will depend on the time required for this program and the production secured. Drilling time for an 1,800-ft. well runs from 12 to 15 days, with additional time for installing pumping equipment. Groups of wells may be operated by central pumping equipment. Arrangements for processing and conditioning the crude for fuel oil purposes have not yet been announced, though plans have been studied for inexpensive treatment at the well head as an alternative to operating an enlarged conditioning plant.

Devonian Test

The important Devonian Test 1, LSD 2, 25-19-3w5, in West Central Turner Valley is below 1,764 ft. after showing some minor faulting in the upper formations. The well started in the Benton shale and faulted back to Belly River at 760 ft., with recurrences of the Benton at 980 ft. and the Belly River at 1,160 ft. The well, jointly sponsored by a number of Turner Valley companies, is planned to drill through the Madison limestone.

CRUDE-OIL PRICES

Representative selected crude prices from all sections of the country appear below:

East Texas	$1.25
Conroe	1.43
Tepetate, Louisiana	1.18
Illinois basin	1.37
Pecos County, Texas	.95
Bradford, Pennsylvania	3.00
Van, Van Zandt County, Texas*	1.08

*No change since 5-21-41.

Gravity Schedules

Top prices include all gravities above grades designated, and low prices include all gravities below grades designated:

Gravity	Signal Hill, Calif.	Oklahoma, Kansas	Gulf Coast Texas	West Texas*
18-18.9	$0.80	....	....	....
19-19.9	.84	....	$1.06	$0.70
20-20.9	.88	$0.85	1.08	.72
21-21.9	.92	.87	1.10	.74
22-22.9	.96	.89	1.12	.76
23-23.9	1.00	.91	1.14	.78
24-24.9	1.03	.93	1.16	.80
25-25.9	1.07	.95	1.18	.82
26-26.9	1.11	.97	1.20	.84
27-27.9	1.15	.99	1.22	.86
28-28.9	1.18	1.01	1.24	.88
29-29.9	1.20	1.03	1.26	.90
30-30.9	1.23	1.05	1.28	.92
31-31.9	....	1.07	1.30	.94
32-32.9	....	1.09	1.32	.96
33-33.9	....	1.11	1.34	.98
34-34.9	....	1.13	1.36	1.00
35-35.9	....	1.15	1.38	1.02
36-36.9	....	1.17	1.40	1.04
37-37.9	....	1.19	1.42	1.06
38-38.9	....	1.21	1.44	1.08
39-39.9	....	1.23	1.46	1.10
40 and above	....	1.25	1.48	1.12

*Includes Lea County, New Mexico.

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Patent Law Offices
418 Bowen Bldg., Washington, D. C.

Leases and Drilling Blocks

LEASES—East Texas, La., South Ark. 20 acres up, dollar acre up.—Owners—Address Attorney, Box 1122, Little Rock, Ark.

LEASES ROYALTIES
PRODUCING OR NONPRODUCING
Texas, New Mexico, Oklahoma, Louisiana and Illinois
20 Years' Experience
Inquiries Invited
B. D. BUCKLEY
60 Broadview Drive, Clayton St. Louis, Mo.

FOR SALE: Oil and Gas Leases on proven structures, drilling propositions, small production and fluospar deposits. Reports furnished. W. P. Harley, Bowling Green, Kentucky.

CRANE COUNTY, Tex., land nearby Gulf's drilling Sec. 2, B-28. Jefferson G. Smith, 215 Littlefield Bldg., Austin, Texas.

FOR SALE: Oil and gas leases North and South Dakota, ten cents acre. Owner. P. O. Box 1163, Tulsa, Oklahoma.

FOR OIL OR SALE: 480 acres, Sec. 340, Coke Co., Texas. 160 acres, Sec. 15, Tp. 16s R. 15, Plaquemines Parish, La. Owner I. Manz, Goddard, Kansas.

INDEPENDENT Operators: Acreage for sale in shallow gas proven area on basis of contracting all natural gas to present lease owner. Box B-402, The Oil and Gas Journal, Tulsa, Okla.

NEW MEXICO
State Oil and Gas Leases
Forty acres and multiples thereof. In a new HoT spot. 23 oil companies own surrounding leases. Write for information. No obligation. HARRY S. WRIGHT, New Mexico State Lessee, Farmington, N. M.

WANTED: Lease, settled production, Okla., Kan., N. Texas. Pay up to $30,000. Box B-413, The Oil and Gas Journal. Tulsa. Okla.

FOR SALE: 50 shallow producing wells in California. For attractive price, write owner, 649 So. Olive St., Room 1027, Los Angeles, Calif.

Royalties

ANDREW J. BARRETT
The Philtower
Tulsa, Oklahoma.

WE BUY & SELL all types of Oil and Gas Royalties. Sales restricted to registered dealers only. Grimes Royalty Co National Mutual Bldg., Tulsa, Okla.

Financing

CAPITAL SEEKERS — Interested in raising $25,000 or more for a legitimate project should write to AMSTER LEONARD, Fox Theater Bldg., Detroit, Mich.

INVESTORS YOU NEED? Organize Company. Contact Stockholders, Lease, Royalty Buyers. Cost Little. We furnish everything. Charter, Prospectus, Campaign, Leads. Faultless Organization. 3439 Michigan, Chicago.

Legal Blanks

THE BURKHART LINE of Legal Blanks Since 1908. Oil-Gas and Business Forms for Mid-Cont. and Illinois Basin. Leases Rev. with Gov.'s Regulations. Catalog and Samples. Burkhart Ptg. & Sta. Co., 115 So. Cincinnati, Tulsa, Okla.

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FORMS CLOSE MONDAY NOON—PUBLISHED EACH THURSDAY

Oil Industry Printing

OIL FIELD LEGAL BLANKS
Leases, assignments, releases, township plat books, well records, etc. Request on your letterhead gets free catalog. Olds Press 215 East Third St., Tulsa. Okla

Help Wanted

SEISMOGRAPH
Large company wants men between the ages of 18 and 40 for non-technical and for technical positions on Seismograph Field Parties. Men without technical education or experience in this or similar work start at 140.00 per month. Others start at higher salaries. For interview write giving experience, education, and other pertinent facts. Those liable for early induction or who are employed in prime war industries need not apply.
Write Box B-400, The Oil and Gas Journal Tulsa, Oklahoma

WANTED: Field Superintendent or Farm Boss. Permanent position. Prefer man experienced in gas and water repressuring in shallow territory. State experience, draft status, and salary expected. Oko Oil & Gas Company, Iola, Kansas.

WANTED: Refinery engineer with several years experience in refinery design and layout. Should have knowledge of modern aviation gasoline manufacturing methods. Apply J. S. Walton, 871 Mills Bldg., San Francisco, Cal.

REFINERY SUPERINTENDENT: Capable of construction and operation of moderate sized plant. Good possibilities of expansion. Remote location. Mechanical knowledge desirable. Give details of training and experience. Box B-412, The Oil and Gas Journal, Tulsa, Okla.

Greetings

WISHING
One and All the Best Christmas Possible
with
A Victorious 1943
Ka-Oka-Tex Drilling Co. Wagoner, Okla.

Help Wanted

ENGINEERS WANTED
Chemical or Mechanical with minimum one year oil refinery plant operation or maintenance experience. Require University Engineering School graduate with basic knowledge principles fluid flow. To work on process flow sheets, equipment selection and general handling oil refinery. Defense Contracts as assistant to senior engineers. No aliens or men engaged Defense work considered. Opportunity up to individual. In reply state experience, education, draft status, salary expected. Foster Wheeler Corporation. Room 2402, 165 Broadway, New York.

Manufacturer's representative known to the best trade, desired for quality oil field, plumbing and industrial specialties now being sold to quality trade; repeat items, excellent commission. Exclusive territories open. Write full details. Box 513, Equity, 113 West 42nd, New York.

GLASS BLOWER for oil refinery near Houston must be able to handle pyrex glass. Work includes making multiple stage diffusion pumps and equivalent laboratory equipment. Salary. Transportation furnished. Send details personal history, experience to Box B-401, The Oil and Gas Journal, Tulsa, Okla.

DESIGNERS
AND
DRAFTSMEN

If you are not now engaged in
IMPORTANT WAR WORK
we need your services
for

OIL REFINERY PIPING
INSTRUMENT SPECIFICATION WRITER
INSTRUMENT PIPING DRAFTSMAN
BILL OF MATERIAL WRITER FOR PIPING

Working a continuous cycle of one week of 44 hours followed by two weeks of 56 hours each; basis of compensation is hourly rate with time and one-half for work in excess of forty hours per week.

Apply at once, giving complete details, including hourly rate desired.

ARTHUR G. McKEE & CO.
2300 Chester Ave.
Cleveland, Ohio

Situations Wanted

WANTED January 1, 1943, position with major oil company or large independent refinery. Technically trained, thirteen years practical experience in process and personnel departments. Box B-394, The Oil and Gas Journal, Tulsa, Okla.

ACCOUNTANT, office manager, handle all taxes; 18 years oil industry experience, aged 41; address P. O. Box 231, Tulsa, Okla.

EXECUTIVE ENGINEER, 15 years experience purchasing for pipe line, production, refining and marketing depts., now employed large independent refiner, desire southwest connection. University graduate, age 37, 3A. Box B-411, The Oil and Gas Journal, Tulsa, Okla.

GEOLOGIST, A. B., young man, draft deferred, field exp. Box B-414, The Oil and Gas Journal, Tulsa, Okla.

COMMERCIAL project manager for refinery construction, purchasing agent, mechanical engineer and accountant. Many years experience as estimator and cost engineer. Box B-416, The Oil and Gas Journal, Tulsa, Okla.

INDUSTRIAL CHEMIST, six years petroleum refining and production experience, desires responsible position with permanent and substantial company. Married, protestant, draft 3-A, good character, dependable, practical. Available on two weeks notice. Box B-419, The Oil and Gas Journal, Tulsa, Okla.

Incorporation

DELAWARE CHARTERS: **Complete service $35. Submitted forms. Chas. G. Guyer. Inc., Wilmington, Delaware.**

Business Opportunities

WISH to contact individual or small group interested assisting development semi-proven shallow field in Wyoming, or would consider purchase cable tool equipment and casing providing haul not unreasonable. Write Box B-399, The Oil and Gas Journal. Tulsa. Okla.

AM INTERESTED in contacting a drilling contractor who is having difficulty getting business. Have good contacts and can raise money and am interested in a deal on a 50-50 basis. If you have a similar idea, contact me and we will make a mutually profitable agreement. Or, if you have different plan maybe we can work something out of it. Box B-417, The Oil and Gas Journal, Tulsa, Okla.

For Sale—Equipment

FOR SALE: Three 100 h.p. Superior engines, with class B McCord lubricators at $2500.00 each. One Goulds pump $1200.00. Four 4x12 V.T.P.P. National Transit pumps. Write or wire PIPE AND MINING SUPPLY CO., 3063 Brighton Blvd., Denver, Colo.

FOR SALE—One complete steam rotary outfit less boilers, located near Coyle, Oklahoma, priced to sell. Inquire T. T. Eason and Company, Enid, Okla.

TANKS FOR SALE
220,000 gal. 43' x 20' Steel Tank. 1—14,000 gal. and 2—11,000 gal. and 1—8,000 gal Steel Tanks. 12—9' x 8' Wood Tanks 2—10,500 bbl. 50' x 30' steel tanks with steel roofs.
L. M. STANHOPE
Wayne. Penna.

FOR SALE: Kirk-Morrow steel ring front, drilling gates, sheaves, belts, pipe fittings, etc. Private owner closing out. Leonard Smith, 1526 N.E. 19th, Phone 5-0841, Oklahoma City, Okla.

ALL TYPES and sizes guaranteed used Valves, 2 million Fire Bricks, large assortment Structural Steel, Water Tube and other type Boilers, Industrial Equipment of any type. Steel Buildings. Industrial Supply & Equipment Co., Inc. 338 Baronne St., New Orleans, La. RAymond 0889

FOR SALE—One #6 Type D-1618 Marley Tapered Type Cooling Tower; capacity 600 GPM; priced right. Inquire Eason Oil Company, Enid, Okla.

5—7½"x20" Type VS, 500# W.P. Clark Compressor Cylinders complete with clearance pockets. Call or write Cimarron Gasoline Corp., Box 246, Coyle, Okla.

Season's Greetings

SONKEN-GALAMBA SUPPLY COMPANY

W. C. Berry or H. J. Galamba
Riverside at Second, Kansas City, Kansas

Robert W. Duden
Union Ave. at Twenty-First, Tulsa, Oklahoma

FOR SALE AT BARGAIN—1 complete rotary rig with Cardwell R.L. double drum drawworks and 7½x12 G.D. Pump, 160 HP Engines. Box 1439, Tulsa, Okla.

FOR SALE: Large quantity Casing and Tubing Clamps. Cities Service Oil Co., Patridge, Bartlesville, Okla.

25 K.W. and 40 K.W. Gas Engines, 220 volts, D.C. Two 100 K.W. Gas Engine-Generator Sets, 220 volts, D.C. 7x6 Ingersoll-Rand ER-1 Air Compressor. Six-inch Oster Pipe Threading Machine. Also large stock of lathes, pipe machines, milling machines, etc. Send for our list.
Terms to suit.
CINCINNATI MACHINERY & SUPPLY CO.
26 West 2nd St., Cincinnati, Ohio.

FOR SALE: 27½" Ideal Rotary Table, 5 sheave 200 ton Crown Block, 4 sheave 72" traveling block, 8" Ideal enclosed rotary hook. Melton Machinery & Supply Co., Seminole, Okla.

FOR SALE: At Oil Hill, Kansas, 500 8⅝" OD 10 V Thread Lap Weld used Casing Couplings, 8⅛" long. Cities Service Oil Co., Patridge, Bartlesville, Okla.

We have in stock for immediate shipment:
15 H.P., Fairbanks-Morse Oil Engine
25 H.P., Tips Oil Engines
40 H.P., Tips Convertible Engines
40 H.P., Tips Gas Engines
50 H.P. 2 cyl., Tips Oil Engine
120 H.P., 3 cyl., Tips Oil Engine
TIPS ENGINE WORKS
Austin, Texas

FOR SALE: Couplings, new, perfect. 2", 2½", 3", 4", 5", 6" and 8" Line and Merchant Cplgs. Also, large stock casg. cplgs. JULIUS M. FOGELMAN. Reading, Pa.

FOR SALE: 43 Joints 1290 feet New Youngstown 3½" OD 13.30# Grade D Smls Internal Upset Drill Pipe Range 2. Also 9 Joints 261 feet out of same string, slightly used, with Hinderliter FH 3 Way Pack-off Tool Joints on each joint. 78 Joints 2340 feet 5⅛" OD 22.20# Youngstown Grade D Range 2 Internal Upset Seamless Drill Pipe with Reed FH Tool Joints on each joint. This string used but in first class used condition. Both strings situated on railroad siding at Wickett, Ward County, Texas. For prices write or wire A. R. Eppenauer, Pecos, Texas.

FOR SALE: 4—40 H.P. Superior 'Two Cycle' Gas Engines with reversible clutches. Good condition.
1—40 H.P. Fairbanks-Morse Diesel Engine. Vertical, type VA Model 32, with starting equipment. Good condition.
STROUBE & STROUBE
Corsicana, Texas

ROTARY EQUIPMENT FOR SALE:
4 4-Sheave Large Traveling Blocks with Hooks Attached
1 3-Sheave Small Traveling Block with Hook Attached
2 6" Swivels—Ideal & Emsco
1 4" Swivel—Oil Well
2 27½" Rotary [illegible]
2 5-Sheave Crown Blocks
2 4-Sheave Crown Blocks
1—150 H.P. Horizontal Fairbanks & Morse Diesel Engine, Model 47
Beardmore Drilling Company, Inc.
Wichita, Kansas

FOR SALE
75-KW Wood System, 220 Volt A.C. York Generating Unit with G.E. 115 Volt 5 HP. Exciter and P-80 International Motor.
Complete Information on Request
EVALUAT'ON & SALES SERVICE
211 E. Pickard
Mount Pleasant, Michigan

FOR SALE. LIKE NEW:
1—Wilson super model workover unit, motor winch, powered with SRKU Waukesha motor with complete set of tools.
1—White tandem truck, model 918, 172" wheel base, 318 cu. in. motor, equipped with winch and oilfield body, 9:00x20 re-caps, new, dual rear and front tires.
YOUNGER BROTHERS, INC.
P.O. Box 8068, Houston, Texas

2—120 HP, 650 RPM, rebuilt Diesel engines, power units.
1—200 HP, 514 RPM, completely rebuilt Diesel engine, power unit.
The two above can be supplied with Generators if desired.
2—66 HP Boilers.
1—75 HP variable speed A.C. motor.
Also variable sizes small alternating current motors.
K. S. RICHARDS
P.O. Box 443, Fort Worth, Texas
Phone 3-5600

FOR SALE—A large stock of reconditioned valves and fittings suitable for refinery and pipe line service. Inquire Eason Oil Company, Enid, Okla.

FOR SALE: 11,000' 2" 4½# Used Lapweld Tubing; 6,000' ⅝x25' Used Sucker Rods; 5—100 bbl. Used Steel Bolted Tanks. Located at Pioneer, Texas. Keystone Production Co., Fort Worth, Texas.

Reconditioned, Tested and Guaranteed Gate Valves for sale, Large stock, sizes 16" to 2", flanged end and screw end. various pressures.
Stock List and Prices on Request.
THE GATE VALVE SHOP
120 Tuke Box 1936
Pampa, Texas

BUY AND SELL
Used Engines, Compressors, Power Plants and Gasoline Plant Equipment.
We Rebuild and Guarantee
L. F. SMITH CO.
217 W. Archer, Tulsa, Okla.

FOR SALE: Baker #8 Wall Scraper with blades for 36" dia. under ream. Perfect shape, complete with subs. $1050.00 f.o.b. New Jersey freight allowed. Tool may be rented. P.O. Box 366, Ridgewood, N. J.

DIESEL ENGINES
Large selection—all sizes and types. Generator units, marine engines, gasoline engines, auxiliaries—also boilers, steam engines, turbo generators.
Complete information on request.
A. G. SCHOONMAKER COMPANY
50 Church St. New York, N. Y.
Phone—Worth 2-0455-6-7

FOR SALE: Compressor unit consisting of:
1—Gardner-Denver class "AB" duplex two stage compressor; 6½ X 2¼ X 5½" 92 cu. ft. per minute displacement, 1000 pounds pressure. "V" belt driven by Ford V-8 engine equipped with Twin Disc clutch power take-off. Compressor and engine equipped with separate radiators and fans. Both engine and compressor were purchased new in 1941 and have been used very little. The engine and compressor unit are mounted on
1—1938 International 1½ ton truck with dual rear wheels. Four nearly new tires. Will also include four mud-grip tires retreaded but never used.
Price $2000.00 f.o.b. Great Bend, Kan.
DEPTHOGRAPH COMPANY
Box 1, Great Bend, Kan.

DIESEL—GAS—ENGINES
Large selection—All sizes and types. Generator units, marine engines, gasoline engines, auxiliaries—boilers, steam engines, and turbo-generator sets.
Complete information on request.
A. G. SCHOONMAKER COMPANY
48 Church Street, New York, N. Y.

FOR SALE: Star Mfg. Company, portable cooling tower, telescoping type, 7' wide, 13' long, 8' high. All steel. Melton Machinery & Supply Co., Seminole, Okla.

FOR SALE: 1—500 bbl. steel bolted tank. 3—250 bbl. steel bolted tanks. Located in Elk County, Kansas. Box 378, Cherryvale, Kansas.

FOR SALE—Approx. 6500 ft. 6⅝" OD 25.20# drill pipe with Reed Full Hole Shrink Grip Tool Joints, A-1 condition. Inquire T. T. Eason and Company, Enid, Okla.

FOR SALE—Two Cardwell model RL double drum well servicing units with spudder attachments complete with wire lines, light plants, cable tools and tool houses. Melton Machinery & Supply Co. Seminole, Okla.

FOR SALE: 50 wells producing approximately 40 barrels 35-36 gravity oil daily upon 1000 acres. 12 nonproducing wells. 10 miles 2" lead lines. 10 miles 2½" pipe line and much other equipment, including 5 good band wheel powers, lease tanks and several thousand feet of 1¼ to 6" pipe in supply yard. All lines painted when laid and now in first-class condition. Initial production 10 to 40 barrels per well. Also 1000 acres in trend of production and first-class steam drilling rig with 4000 feet good drill stem. Owner retiring. Don't write. Come and see. Alexander Boynton, 615 Insurance Bldg., San Antonio, Texas.

SPECIAL OFFER
IMMEDIATE SHIPMENT
OXYGEN-ACETYLENE WELDING HOSE SETS
Guaranteed—Heavy Duty
Standard Size—Double Braid
Samples furnished on request

Each set consists of OXYGEN hose (BLACK) and ACETYLENE hose (RED) with standard brass couplings attached to fit all makes of torches and gauges.

Length set	*Price per set*
12½ Ft. set	$ 3.10
25 Ft. set	5.60
50 Ft. set	10.60
75 Ft. set	15.60
100 Ft. set	20.60
Connector set	.30

Hose also furnished in continuous length reels of approximately 250 ft. and 500 ft. lengths.

OXYGEN HOSE	10c per ft.
ACETYLENE HOSE	10c per ft.
STANDARD COUPLINGS	15c each

Prices net—F.O.B. New York

CARLYLE RUBBER CO., Inc.
62 Park Place New York, N. Y.

FOR SALE: Pipe tongs, various sizes from 3" to 20". Box B-371, The Oil and Gas Journal, Tulsa, Okla.

FOR SALE: Complete Wilson Portable Rotary Rig with telescoping mast, suitable for 2,000 ft. drilling. Melton Machinery & Supply Co., Seminole, Okla.

Second hand alloyed sucker rods, ⅞", ¾", and ⅝".
Sucker Rods, Fishing Tools, Tubing Spiders, Tubing Catchers, all sizes.
Structural Steel and Reinforcing Rods.
M. R. TRAVIS
1702 S. Boulder Tulsa, Oklahoma

FOR SALE: At Oil Hill, Kansas, one carload ⅝" Junk Sucker Rods, and at Oklahoma City one carload ⅞" Junk Sucker Rods. Cities Service Oil Co., Patridge, Bartlesville, Okla.

FOR SALE—One partial list steam rotary equipment less boilers, rotary table, traveling block, swivel, located near Coyle, Oklahoma, priced right to sell. Inquire T. T. Eason and Company, Enid, Okla.

STEEL TANKS
2—6000 Gal. R.R. Car Tanks
4—17,300 Gal. 10'x29'6" horizontal.
2—20,150 Gal. 11'x28'6" horizontal.
220.000 Gal. 43'x20' Vertical
L. M. STANHOPE
Wayne, Penna.

FOR SALE—Two 15x10 Chicago Pneumatic Compressors less motors or power units. In excellent condition, suitable for low pressure service. Inquire Eason Oil Company, Enid, Okla.

Equipment Wanted

WANTED TO BUY

Pipe of all sizes, 2" to 16" inclusive, also refineries, pipe lines and abandoned wells. Wire, write or phone

Louisiana Iron & Supply Co.
Shreveport, La.

WANTED
Abandoned *Pipe Lines*, in or out of the ground, *Oil Wells, Steel Buildings* and Steel Storage *Tanks* of all sizes.
JOS. GREENSPON'S SON PIPE CORP.
National Stock Yards, St. Clair Co., Illinois.

WANTED—Steel tanks total 120,000 gallon capacity. Will take 5000 gallon or larger. Tidewater Equipment & Machinery Corp., 305 Madison Ave., New York. N. Y.

PIPE OWNERS OR DEALERS
Operator wishes to purchase two miles 2 inch pipe suitable for gas line and pay for same from gas sales. Have the gas. Have the market. Box B-403, The Oil and Gas Journal, Tulsa, Okla.

WANTED TO BUY Marine Diesel Engines. What do you have to offer?
Industrial Supply & Equip. Co., Inc.
338 Baronne St., New Orleans, La.
RAymond 0889

WANTED: Spudders and Cable Rigs capable of drilling 1500 ft. to 6000 ft. complete with tools. Box B-395, The Oil and Gas Journal. Tulsa, Okla.

WANTED: Cardwell well servicing unit with spudder attachments. Suitable for 4500' depths. Would consider different make. Box 378, Cherryvale, Kansas.

WANTED: 1000 feet of 2⅞ in. P.K. Drill Rods. Must be in good condition. Box M-410, The Oil and Gas Journal, Tulsa, Okla.

WANTED: Three inch drill pipe in good condition. Box B-415, The Oil and Gas Journal, Tulsa, Okla.

DIESEL ENGINES WANTED
1500 HP in one or more units with or without Generators. Single unit preferred. Give full information. Box B-418, The Oil and Gas Journal, Tulsa, Okla.

DIESEL ENGINES
Total 1600 HP required, with or without Generators. Consider units 225 HP and larger. Also smaller high speed units for standby service. Preference given units immediately available. Give complete details and price. Address Purchasing Department, Box B-353, The Oil and Gas Journal, Tulsa, Okla.

Journalisms;

THE Inter-American issue of the Journal, which appears next week, will contain numerous authoritative articles on the trend of developments south of the Rio Grande. The war has greatly affected the oil industry of our Latin-American neighbors and this has had a pronounced effect on exports from the United States. Despite the tangled condition of world markets, Latin America is continuing with its program of steady development and is destined to play an increasingly important part in the post-war world.

•

OF outstanding interest from the Rockies to the Atlantic seaboard is the "big inch" line from Longview, Tex., to Norris City, Ill., and its extension to the East Coast refining centers. It is fitting that the Journal opens a year of intensive coverage of all phases of petroleum engineering with a complete account of this line. Articles which will appear in a special section of the January 7 issue cover the history of the project, the laying of the line, and station construction and operation. The men who are responsible for the building of this record-breaking transportation system need not be introduced to the industry for their achievements have made them well known. These achievements are the subject of an article in this section.

■

MANY oil-field jobs have just grown, with the methods employed governed by the man in the field rather than by the employer. Frequently this leads to much waste motion and lost time. Often the efficiency and the interest of the workman in his job are impaired by the necessity of doing jobs which could be more economically and efficiently performed by someone else. With today's shortage in manpower, field work must be more efficiently organized, which may be done in two ways. One of these is the well-known "speed up" which will simply make the workman work harder, without solving any of the difficulties which he now faces. The second method is to analyze the job and add to his value by eliminating unnecessary work and by cutting out waste motion. Beginning in the January 7 issue of the Journal, there will appear an article by H. G. Thuesen, head of the Department of Industrial Engineering, Oklahoma Agricultural & Mechanical College, and M. R. Lohman, assistant professor in the same department, outlining the principles of job design and illustrating its application to pumping. The authors have had considerable practical experience with such companies as General Electric, Westinghouse, and Aluminum Co. of America, before becoming associated with the college. They have pioneered in the application of method study or job design in the drilling and production phases of the oil industry, having been recently associated with several oil companies.

H. G. THUESEN

M. R. LOHMANN

■

AFTER several weeks in training, Fred L. Singleton, formerly in charge of the Journal's Houston office, has got off duty long enough to visit a photographer. Following several years in the land and lease department of Sinclair Prairie Oil Co., in Fort Worth, Fred came to the Journal in 1931, working in the Fort Worth office until 1934 when he was transferred to Houston, where he was in charge of field reports for that area. He held that post until October, when he enlisted in the Army Air Corps and was assigned to the engineering office of the 72nd Training Squadron at Ellington Field, Texas.

FRED SINGLETON

■

WHETHER or not a pipe line is in need of cleaning or repair depends on the way in which it is operating. Formulas have been prepared at various times in which the measure of the line's efficiency is a coefficient which varies with the fluids being transported. Benjamin Miller, of Gas Advisers, Inc., has prepared a paper for the Engineering and Operating Section in which he recommends consideration of an efficiency factor which is characteristic of the line itself, not of the fluid. This paper will appear in the January 7 issue.

■

THE drawdown method of determining the relative productivity of oil wells is often regarded solely as one of a number of ways of establishing potentials. It is actually so effective a conserver of steel that, according to Kansas state officials, it was impossible for them to add materially to the conservation of steel under the demands of the war program. How this has greatly reduced equipment costs and increased efficiency in production is set forth in an article in the January 7 issue.

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CALENDAR

1943

February

NATIONAL OIL SCOUTS AND LANDMEN'S ASSOCIATION, business session, Dallas, Tex., February 4, 1943.

AMERICAN INSTITUTE OF MINING AND METALLURGICAL ENGINEERS, New York, February 15-18, 1943.

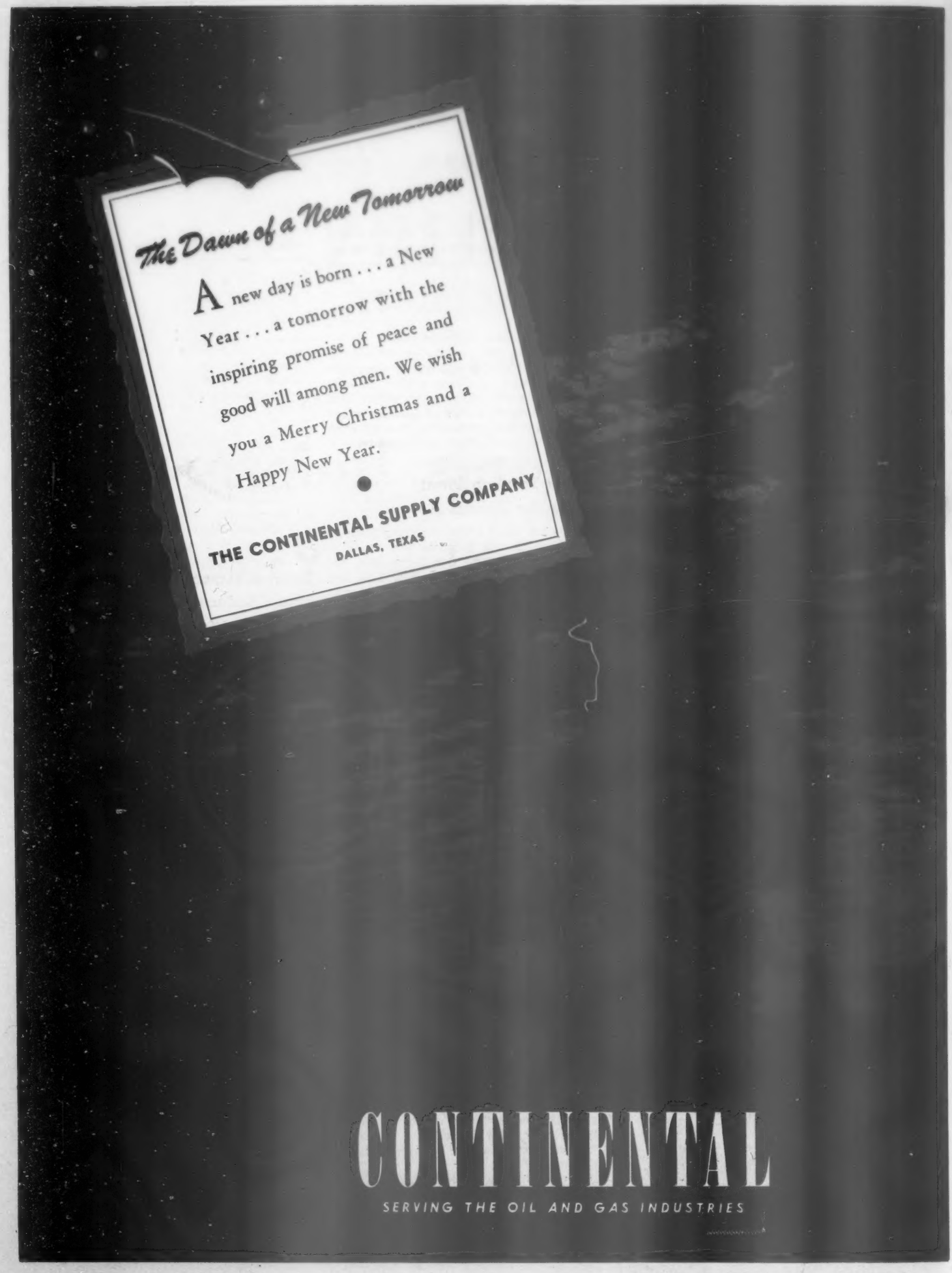
April

AMERICAN PETROLEUM INSTITUTE, Division of Production, Eastern district, William Penn Hotel, Pittsburgh, Pa., April 8-9, 1943.

AMERICAN ASSOCIATION OF PETROLEUM GEOLOGISTS, annual meeting, Fort Worth, Tex., April 7-9.

May

PETROLEUM INDUSTRY ELECTRICAL ASSOCIATION, annual meeting, Houston, Tex., May 5-6, 1943.


The Dawn of a New Tomorrow
A new day is born . . . a New Year . . . a tomorrow with the inspiring promise of peace and good will among men. We wish you a Merry Christmas and a Happy New Year.
THE CONTINENTAL SUPPLY COMPANY
DALLAS, TEXAS
CONTINENTAL
SERVING THE OIL AND GAS INDUSTRIES

ENGINEERING *and Operating* SECTION

▼

Lower End Points, Reform More To Reduce Gasoline Yield

By ARCH L. FOSTER

Reduce gasoline yields, PAW says; means less and "easier" cracking, more 2 and 4-cent, less 6-cent products, same operating costs. Octane number must be kept up, tetraethyl lead consumption curtailed. Refiners meet this paradoxical situation by lowering end points, reforming, light cracking, and—taking a stiff loss which probably will force some to the wall.

MEETING the new yield requirements issued by the petroleum administrator is perfectly simple, with various exceptions, refiners say. Some of those exceptions are that the refiner cannot make enough money from products to pay for the crude, its transportation to the refinery and for processing it. He cannot raise the octane number of his total gasoline output, by cracking, to permit raising it to competitive levels with permissible amounts of tetraethyl lead, for his TEL purchases are curtailed. And he cannot produce polymer—codimer—for hydrogenation to isooctane for aviation superfuels without production of butenes, by cracking; cracking increases total gasoline percentage. He may thus be driven to try to do two or three mutually contradictory things at the same time.

The private business of refining petroleum has not the power to raise ceilings or prices at will to make up a deficit. Thus he cannot take advantage of the normal working of the law of supply and demand.

Yet there are those who say that the refiner can live by a proper rejuggling of operating conditions, by subdividing his crude charged to meet the requirements. He has been asked to reduce his gasoline production to 75 per cent of his average yield during the last half of 1941, to produce what generally amounts to 22 per cent or more of heavy fuel oil, and to do what he may with the intermediate fractions. In so doing he converts a goodly proportion of material which has been selling formerly for 6 to 7 cents per gallon to cheaper material selling at from 2 to 4 cents. Unavoidably he must take a licking, unless ceilings are raised to permit prices more in keeping with general economics. Crude prices range generally from a dollar upward, at the well. Under the lower gasoline yield, heavier crudes show certain definite advantages, a complete reversal of form for the refiner. Consequently the high gravity, high-priced crude puts its refiners near or in the danger zone. The price of $1.25 per barrel will be used here, therefore, as a basis for calculations; crude prices below that give the refiner somewhat better chance to realize on his operation, simply that more cracking is permitted with the heavier, lower gasoline-content charge stock.

Cost to the Refiner

Handling costs of crude from field to refinery vary widely, of course; an average figure of 8 cents is adopted for our purposes; any variations from either crude or handling costs change the values given but not the order of the following calculations. The initial investment for crude, therefore, will average about $1.33 per barrel, for these purposes.

The total cost of refined products f.o.b. the refinery is $1.33 plus processing costs. Operating costs and the methods of calculating them vary so widely that no attempt can be made here to give more than the roughest estimate; even that may be seriously misleading. Under normal conditions operating costs for a skimmer-cracker plant, not producing lubricants, have been estimated all the way from 12 cents to 63 cents per barrel of charge. Probably the average will lie somewhere betwen $1.50 and $1.75 per barrel of crude.

To summarize the situation, the refiner *must:*

1. Reduce gasoline output to 75 per cent of 1941 figures; this means reduction from about 52 per cent, average of the Mid-Continent and Southwest (excluding the Gulf Coast) to about 39 per cent. Some refiners making a maximum of about 65 per cent will be reduced to about 49 per cent. Refiners who have been producing 40 per cent gasoline and less will be reduced to a yield little if any higher than the straightrun in the crude in many cases. To do this he *must:*

2. Make and sell more kerosene, the next highest-priced product he can make in quantity;

3. Make more distillate and residual fuel oils—heavy oil, No. 6, for the Army, Navy, Merchant Marine and the railroads, also industrial plants now operating mostly at top capacity;

4. Make standard housebrand octane ratings without too much cracking which increases total gasoline yields.

To accomplish these and other results the refiner *may:*

1. Reduce gasoline yields by lowering end point of straightrun gasoline produced; by reforming any or all portions of straightrun gasoline and/or naphthas; by making all sorts of special naphthas, paint thinners, cleaner's naphtha (Stoddard solvent), tractor fuels and distillates, from heavier ends of gasoline; by running heavier crude and thus reducing the straightrun naphtha made.

2. Increase kerosene percentage by adding to that fraction all the heavy naphtha which may be used and remain within flash point and distillation specifications and adding corresponding amounts of heavier material to balance these specifications (by drastic chemical treating, in

serious cases, of heavy pressure distillate bottoms by which salable products may be made, albeit not a practice indulged in in normal times:

3. Make all intermediate fractions into No. 1 fuel oil, the highest-priced product below kerosene except diesel fuel, which latter can be produced to the extent of sales demand, the remainder of intermediate cuts going as No. 1 fuel;

4. Make all heavy fuel to specifications as it comes from the stills, so no cut-back blending is required;

5. Polymerize all possible olefins first to codimer, if practicable, and the residue nonselectively to polymer gasoline;

6. Segregate any fraction useful for war products—benzene, toluene or mixtures of aromatics—on which an increased price may be realized. A B-B cut containing large percentages of butane and butenes can be sold in some cases.

To this list might well be added "Get a catalytic cracker or an interest in one, for present and future advantage; also an alkylation unit, isomerization unit, or any combination of these which can be installed and operated."

In general, on the basis of operating plans, refineries may be divided roughly into four classes: larger refineries operating lubricating-oil units and probably some special large-capacity unit for war products, as catalytic crackers, aviation-fuel alkylation units, etc.; skimming-cracking plants making 50 per cent or so of total motor fuel, and a more or less full line of other fuels; skimming-cracking plants which strive for a maximum gasoline output with a minimum of kerosene and fuel oil, usually no or practically no distillate fuel oils; and the plants operating on heavy or special crudes producing considerably less than the average motor-fuel yield, plus a line of specialties, asphalt and road oils, naphthas, solvents, etc.

Motor fuel, straightrun or other gasoline, as outlined in last week's discussion (The Oil and Gas Journal, Dec. 17, p. 12) made in Class 1 plants must be disposed of either in the refinery's commercial outlets, the answer in most all cases, or must be allowed for in the total national output because it is necessary that this product be made to obtain the critical products required.

The majority of southwestern refiners fall into either the second or third classes, a few into the fourth. In the second class a typical operation's yields and realization were given last week (p. 13) showing a total return of $1.8825 per barrel of crude processed. This amount left 1.8825 — 1.33 = 0.5525 or 55.25 cents per barrel, with which to pay operating costs and realize a profit.

In the same issue a summary of return is given for a different lineup of yields of the same products, outstanding in which is 39.4 per cent gasoline, 23 per cent heavy fuel oil and 16.5 per cent kerosene. The total realization from this operation which meets requirements is $1.8173, allowing a margin of 48.73 cents per barrel to cover operating costs and profits. At an operation cost of not exceeding 1 cent per gallon of crude the refiner may possibly break even on this plan; at any additional cost he most assuredly will operate in the red, more especially when running at 60-70 per cent capacity as the majority of refiners are doing now.

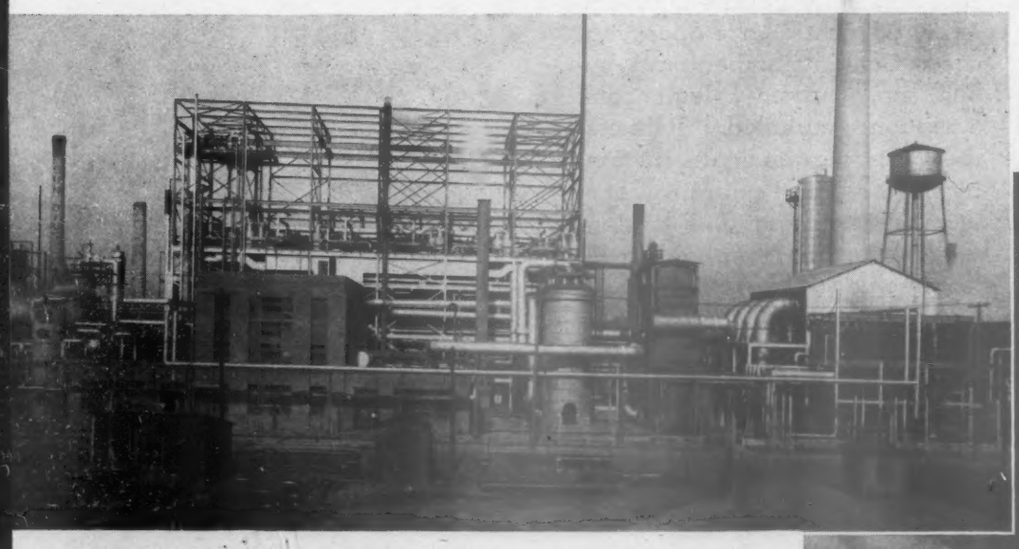
TABLE 1—SUMMARY OF YIELDS AND REALIZATIONS FOR DIFFERENT METHODS OF OPERATION

		1		2		3		4		5	
Product—	Price c/gal.	Yield %	Return	Yield %	Return	Yield %	Return	Yield %	Return	Yield %	Return
Gasoline	6.2	54.0	3.3500	54.0	3.3500	40.0	2.4800	40.0	2.4800	40.0	2.4800
Farm-tractor dist.	5.0	....	.....	....	.....	3.5	0.1750	3.5	0.1750	....	.....
Kerosene-range oil	4.5	....	.....	10.0	0.4500	....	.....	15.0	0.6750	20.0	0.9000
No. 1 fuel	4.05	13.0	0.5265	1.5	0.0608	21.0	0.8505	5.0	0.2025	10.0	0.4050
No. 2 fuel	3.65	3.5	0.1278	5.0	0.1825	5.5	0.2008	6.5	0.2373	1.0	0.0365
Diesel fuel	4.2	....	.....	....	.....	....	.....	....	.....	2.0	0.0840
No. 6 fuel	2.0	22.0	0.4400	22.0	0.4400	22.0	0.4400	22.0	0.4400	9.0	0.1800
Asphalt-road oil	2.60	....	.....	....	.....	....	.....	....	.....	12.0	0.3120
Gas and loss	..	7.5	.....	7.5	.....	8.0	....	8.0	.....	6.0	.....
Total—100 gal.	..	100.0	4.4443	100.0	4.4833	100.0	4.1463	100.0	4.2098	100.0	4.3975
Total— 42 gal.	..	....	1.8660	....	1.8749	....	1.7415	....	1.7681	....	1.8470
Reduction from Oper. 2	..	....	—0.0089	....	.....	....	—0.1234	....	—0.1068	....	—0.0279
Balance above $1.33	..	....	0.5360	....	0.5449	....	0.4115	....	0.4381	....	0.5170

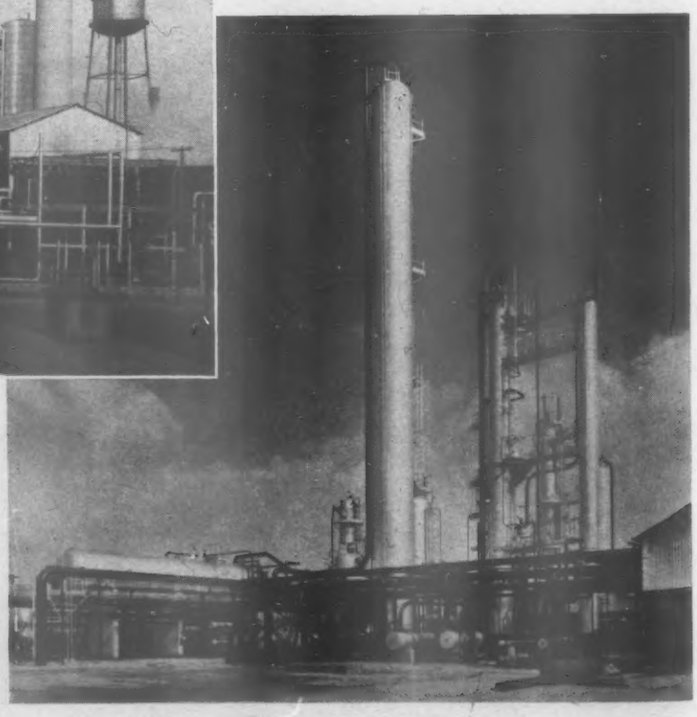
Realization From Operations

In Table 1 are presented prices, yields and gross realization from a typical barrel of crude or mixture of crudes, taken from the estimates and calculations of different refiners operating on the same general types of crude which are similar enough to permit safe comparisons. The prices are averages of two or more values received by different refiners for essentially the same product. Operations 1 and 2 show yields and returns when operating to increase fuel-oil yields, but before reduction of gasoline output to practically 40 per cent of the crude. With high-burning oil yields and no kerosene the return per barrel is $1.8660, Operation 1. Production 10 per cent kerosene at 4.5 cents and only 1.5 per cent of No. 1 burning oil with No. 2 oil raised to 5 per cent under Operation 2 the return is the highest obtained, $1.8749, but only 0.89 cent higher than from Operation 1. The lowest return is with Operation 3, $1.7415, a loss of $0.1334 as compared to Operation 2. This high loss is due, again, to making no kerosene, the highest priced product after gasoline in the list shown. The gross profit on this operation, $0.4115, reduces the margin for paying running expenses and profits to less than 1 cent per gallon, which in many cases may prove to be too small to permit that refiner to survive.

Operation 5 is a particularly attractive one under the conditions. It can be followed only if the refinery has available the vacuum, steam or other



Left: Catalytic cracking units, such as this Houdry installation, are running full blast to supply motor and aviation fuels for the armed forces. Catalytic units will play a controlling part in refinery technology of the future



Right: Catalytic units such as this one are being used to produce alkylate, a major component of aviation superfuels. Many refiners thus can aid in meeting the ever-increasing demand for aviation fuels, who have no other equipment which can be so used